COOPER Tools

Operation & Service Manual

823060 **12/01**

Quackenbush®

120SC-112 SELF-COLLETING DRILLS

Houston Operation
7007 Pinemont
Houston, TX 77040

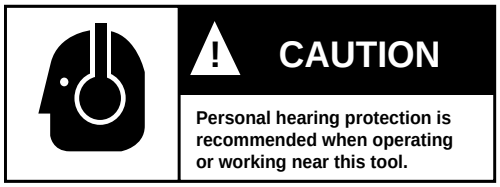
Recoules Operation
Zone industrielle - B.P. 28
Avenue Maurice Chevalier
77831 Ozoir-la-Ferriere Cedex France

Safety Recommendations

For your safety and the safety of others, read and understand the safety recommendations and operating instructions before operating any drill motor.

Always wear protective equipment:

For additional information on eye protection, read the latest edition of ANSI Z87.1, Occupational and Educational Eye and Face Protection. This standard is available from the American National Standards Institute, Inc., 25 West 43nd Street, 4th Floor, New York, N.Y. 10036.



Hearing protection is recommended in high noise areas (above 85dBA). Close proximity of additional tools, reflective surfaces, process noises, etc., can contribute substantially to the sound level experienced by the operator.

Follow good machine shop practices. Rotating shafts and moving components entangle and entrap, and may result in serious injuries. Never wear long hair, loose-fitting clothes, gloves, ties, or jewelry when working with or near a drill of any type.

Quackenbush drills are designed to operate on 90psig (6.2 bar) maximum air pressure using the proper hose. Excessive air pressure increases the loads and stresses on tool parts and drills, and may result in breakage. The installation of a filter-regulator-lubricator in the air supply line ahead of the tool is highly recommended.

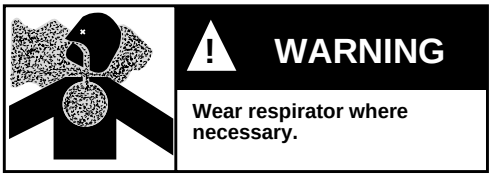
⚠ CAUTION

- Before the tool is connected to the air supply, the throttle should be checked for proper operation (i.e., throttle valve moves freely and returns to closed position).

- Before removing a tool from service or changing drill bits, make sure the air line is shut off and drained of air. This will prevent the tool from operating if the throttle is accidently engaged.

- Cutting tools used with these drill motors are sharp. Handle them carefully to avoid injury.

- The collet and mandrel must be inserted into a properly sized pre-drilled hole before starting the tool. An improperly sized pre-drilled hole prevents the mandrel from engaging the collet and could result in slippage of the tool. An improperly selected collet and mandrel can also result in slippage of the tool.



Drilling or other use of this tool may produce hazardous fumes and/or dust. To avoid adverse health effects utilize adequate ventilation and/or a respirator. Read the material safety data sheet of any cutting fluids or materials involved in the drilling process.

⚠ CAUTION

Some non-ferrous metal chips (or dusts) are combustible. Examples: Aluminum, magnesium, Titanium, and Zirconium. See the material safety data sheets for combustibility of materials drilled. Never collect spark generating material with combustible material. Examples: Collecting both steel and aluminum or steel and titanium.

CAUTION
Slip and fall hazard.
• Lubricant and coolant systems must be properly maintained to avoid leakage.
• Hoses must be organized and care taken to avoid tripping.

Quackenbush drills are often used with lubricant or cooling systems which must be properly maintained to avoid leakage. Failure to do so can result in serious injuries from slipping on oily surfaces.

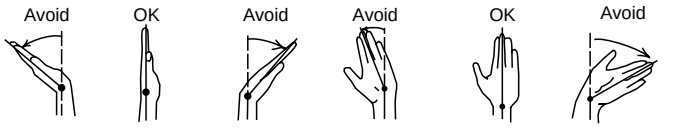
Safety Recommendations

WARNING
Keep hands away from clamping and feed mechanisms. Clamp mechanism moves when drilling and connecting or removing air supply.

Due to the number and variety of tooling applications, the user's methods engineering departments, ect., must consider any hazards that may be associated with each specific application of this product and provide adequate operator protection from inadvertent contact with any moving components. The clamping and feed mechanisms of self-colleting drill motors are exposed for visibility and can move when the air supply is connected or disconnected. To avoid injury, keep fingers and hands away from these areas when handling or operating this tool.

Some individuals are susceptible to disorders of the hands and arms when exposed to vibration and/or tasks which involve repetitive work motions. Those individuals predisposed to vasculatory or circulatory problems may be particularly susceptible. Cumulative trauma disorders such as carpal tunnel syndrome and tendinitis can be caused or aggravated by repetitious, forceful exertions of the hands and arms. These disorders develop gradually over periods of weeks, months, and years. Tasks should be performed in such a manner that the wrists are maintained in a neutral position, which is not flexed, hyperextended, or turned side to side. Stressful postures should be avoided and can be controlled through tool selection and work location.

Any tool operator should be aware of the following warning signs and symptoms so that a problem can be addressed before it becomes a debilitating injury. Any user suffering from prolonged symptoms of tingling, numbness, blanching of fingers, clumsiness or weakened grip, inability to hold objects, nocturnal pain in the hand, or any other disorder of the shoulders, arms, wrists, or fingers should notify their employer so that a review of what steps might be taken to prevent further occurances. These steps might include but are not limited to, repositioning the workpiece or redesigning the workstation, reassigning tool users to other jobs, rotating jobs, changing worker pace, and/or changing the type of tool used so as to minimize stress on the operator. Some tasks may require more than one type of tool to obtain the optimum operator/ tool/ task relationship.

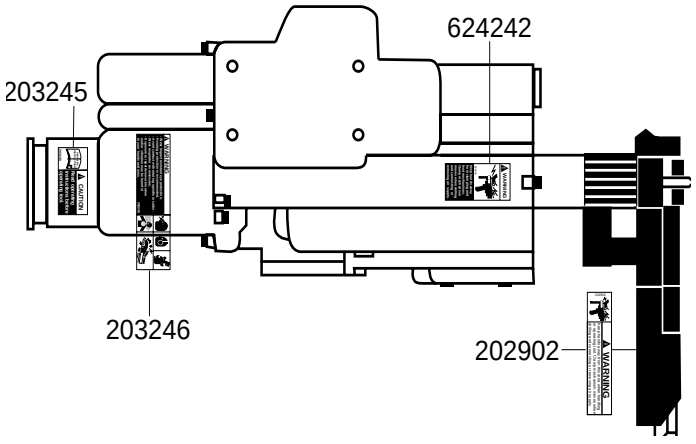


The following recommendations will help reduce or moderate the effects of repetitive work motions. The operator of any drill should:

- Use a minimum hand grip force consistent with proper control and safe operation
- Keep body and hands warm and dry
- Avoid anything that inhibits blood circulation
  - — Smoking Tobacco
  - — Cold Temperatures
  - — Certain Drugs
- Avoid awkward postures
- Keep wrists as straight as possible
- Interrupt work, activities, or rotate jobs to provide periods free from repetitive work motions.

Safety Labels

The safety labels found on this tool are an essential part of this product. Labels should not be removed. Labels should be checked periodically for legibility. Replace safety labels when missing or when the information can no longer be read. Replacement labels can be ordered by the part numbers shown on this page.



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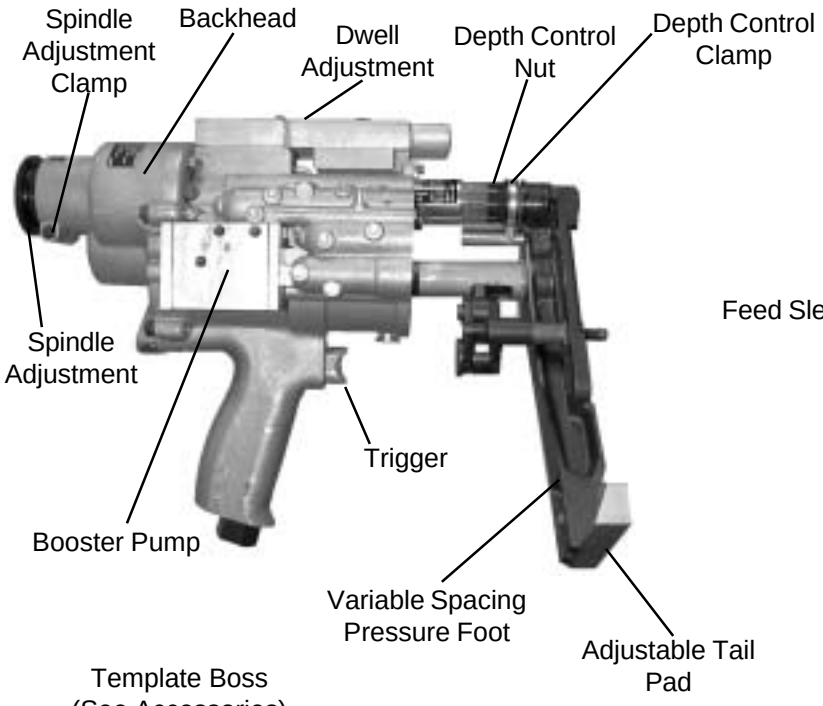
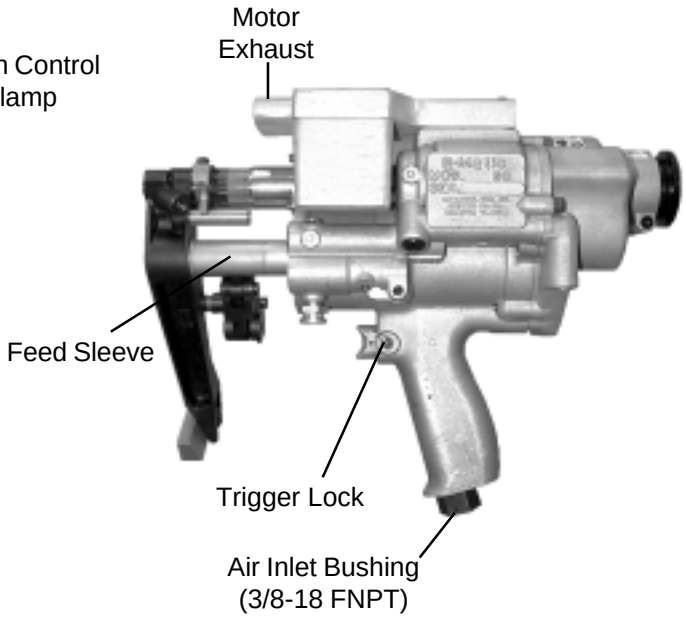
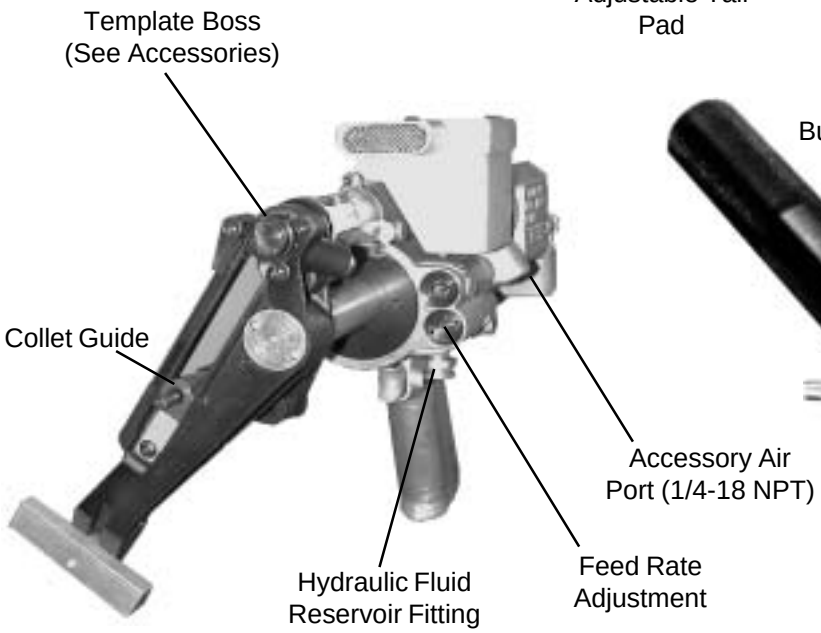
Major Tool Components







Special Tools

Introduction and General Information

The 120SC-112 drill is an air operated, hydraulically controlled tool that automatically clamps to the material, drills and countersinks close tolerance holes in one operation.
The 120SC-112 will produce high quality holes in aluminum, steel, titanium and composite materials primarily found in the aircraft/aerospace industries. The 120SC-112 has been designed using state-of-the-art technology that provides maximum power, minimum weight and the highest degree of accuracy for demanding hole preparation requirements.

Technical Data

Feed Stroke: Feed stroke of the 120SC-112 is 1.1 inches to drill and countersink in 1 inch stacked material. The feed stroke is unaffected by the collet stroke.
Collet Stroke: The 120SC-112 will clamp throughout its .5 inch stroke. Collet stroke is unaffected by feed stroke.
Spindle Adjustment: The spindle adjustment of .375 inch allows for drill length variations. See Spindle Adjustment information on page 24.
Countersink Depth Control: A micrometer adjustment provides for countersink stop repeatability within .001 inch.
Cutter Sizes: The 120SC-112 will accommodate .375 diameter drills without countersink and .328 diameter drills with .625 countersink diameter.
Feed Rate: An adjustable drill feed rate mechanism enables the 120SC-112 to drill from 5 seconds per inch to 1 minute per inch. See Feed Rate Adjustment information on page 22.
Cutter to Collet Spacing: The cutter to collet distance is adjustable between .875 inch minimum to 3.50 inch maximum.
Coolant: The 120SC-112 has a drill point coolant port in the pressure foot. A coolant mist generator is available. (See Accessories Page 36)
Air Motor: The air motor develops 1.2 horsepower when supplied with air at 90 p.s.i.
Air Consumption: Air consumption of the 120SC-112 is 45 c.f.m. at 90 p.s.i. dynamic.
Weight: Tool weight with the steel pressure foot is 12 pounds.
Spindle Speeds: Ten geared spindle speeds are available: 270, 470, 700, 900, 1150, 2200,3500, 5500, 7000,14,000 & 23,500 RPM. See pages 33 and 34 for gear set assembly. Configurations. Any gear set can be used with the 120SC-112 tool **Trigger Lock:** A trigger lock is provided which allows the tool to be locked in the "Operate" position. With the lock activated, the tool will run through the clamp, feed and retract cycles, but it will not unclamp or stop the motor until the trigger lock is manually released.

Tool Start-Up

The 120SC-112 is shipped from the factory equipped to the customer's specifications: spindle RPM, spindle to accommodate cutter type desired, pressure foot type, collet guide to accommodate collet desired, and optional booster pump (if required).
After unpacking, examine the customer-specified equipment on the 120SC-112 tool to verify type and speed of components.
Attach air line to 3/8-18 NPT inlet bushing. If quick disconnect fittings are used, 3/8 in. ID are minimum. The 120SC-112 requires a supply of clean 90-100 PSI air. Air consumption is 45 CFM at 90 PSI. The use of the in-line lubricator will provide the proper lubrication for the air motor and will significantly increase the tool life expectancy.
Because O-rings are extensively used to seal systems within the tool, the elimination of foreign particles and other contaminants will reduce the possibility of damage to these parts. Always inspect O-rings for damage or wear and replace as required. The use of silicone O-ring lubricant is strongly recommended during reassembly. The addition of oil in the air line will also increase motor and valve life as well as the life of the O-rings. Avoid the use of synthetic lubricants to prevent damage to O-rings and seals.

120SC-112 SELF-COLLETING DRILL SPECIFICATIONS

WEIGHT	12 LBS. MAX. W/STEEL FOOT
AIR CONSUMPTION	45 C.F M. @ 90 P.S.I. DYNAMIC
HORSE POWER	APPROX.1.2 @ 90 P.S.I.
O/A LENGTH	13.04 IN. MAX WITH SPINDLE ADJUST AT FULL EXTENSION
STROKE	1.1 IN. (DRILL &C/SINK 1 IN. STACK)
COLLET STROKE	.5 IN. (NO LOSS OF FEED STROKE)
COUNTERSINK	COUNTERSINK STOP REPEATS WITHIN .001 IN.
FEED RATE	MIN. 5 SEC. PER INCH & MAX. 1 MIN. PER INCH
SPINDLE SPEEDS	270, 470, 700, 900, 1150, 2200,3500, 5500, 7000,14,000 & 23,500 RPM
DRILLING THRUST	234 LBS. MAX. (UNREGULATED AIR)
CLAMP FORCE (W ASSIST SPRING) (W ASSIST SPRING) (W/O ASSIST SPRING)	 548 LBS. START CLAMP STROKE (UNREGULATED AIR) 460 LBS. FULL CLAMP STROKE (UNREGULATED AIR) 290 LBS. (UNREGULATED AIR)
SPINDLE ADJUSTMENT	.375 IN. ADJUSTMENT TO ALLOW FOR DRILL LENGTH VARIATIONS
MAX. DRILL SIZES	.375 (NO C/SINK), .328 (.625 C/SINK DIA.)
COLLET FOOT SPACING	.875 IN. MIN.—3.50 IN. MAX.
SPINDLE	.500 IN. DIA: TUBE W/1/4-28 & 3/8-16 IN. THD. FOR I.D. THREAD TYPE DRILLS OR 1/4-28 TAPER-LOK TYPE DRILLS.
COOLANT	AIR BLAST PORT & DRILL POINT PORT IN TEMPLATE STD., COOLANT MIST GENERATOR AVAILABLE.

1. DIAGRAM OF AIR AND HYDRAULIC SYSTEMS IN STANDBY CONDITION. Trigger released, compressed air attached, collet unclamped, cutter fully retracted, air motor stopped.

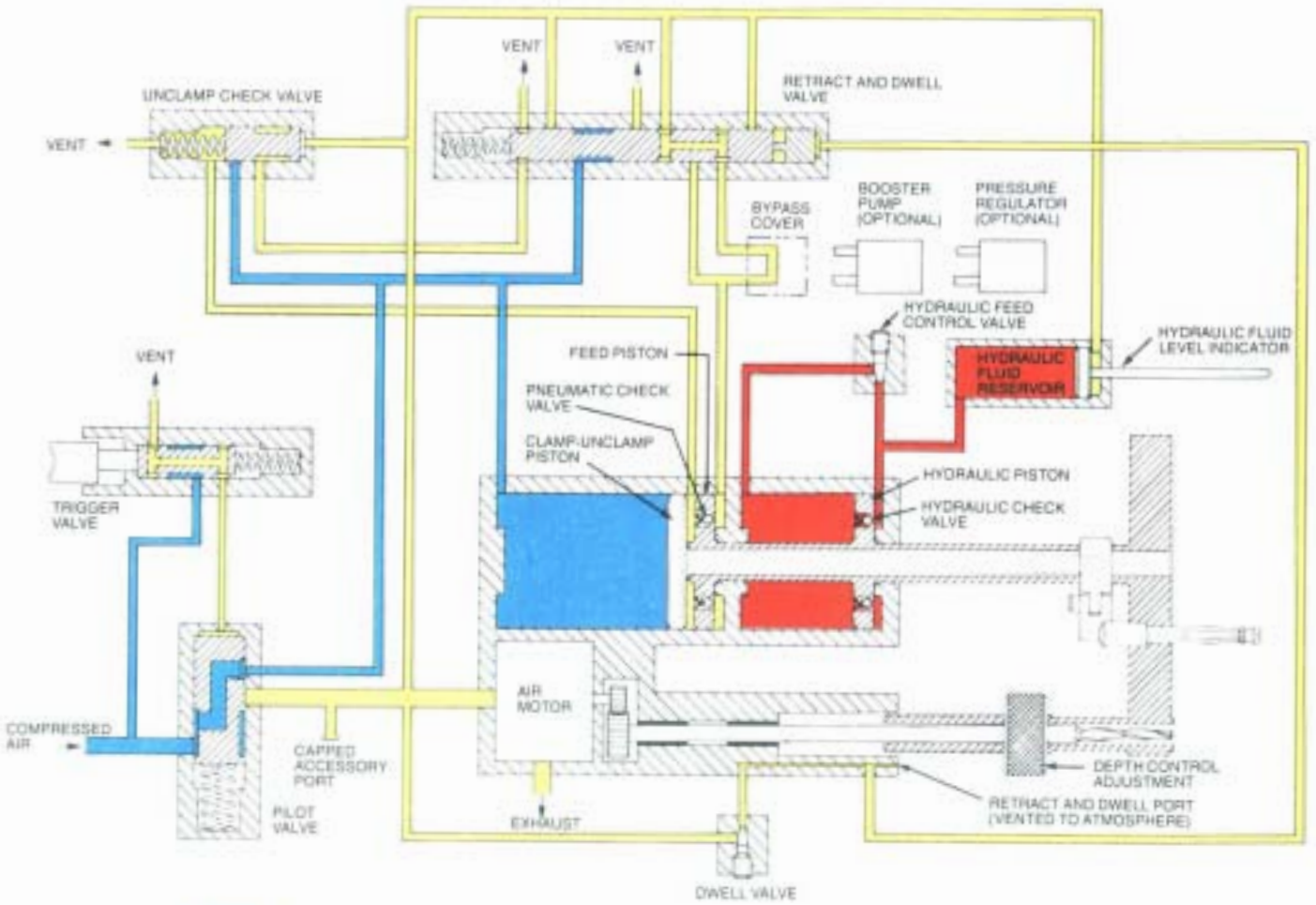


FIGURE 1

2. DIAGRAM OF AIR AND HYDRAULIC SYSTEMS AT FULL COLLET STROKE AND START OF CUTTER FEED. Trigger depressed, pilot and unclamp check valves shift, air motor starts, collet first clamps fully, then cutter starts feeding and continues to feed until pre-set depth has been reached (See Figure 3).

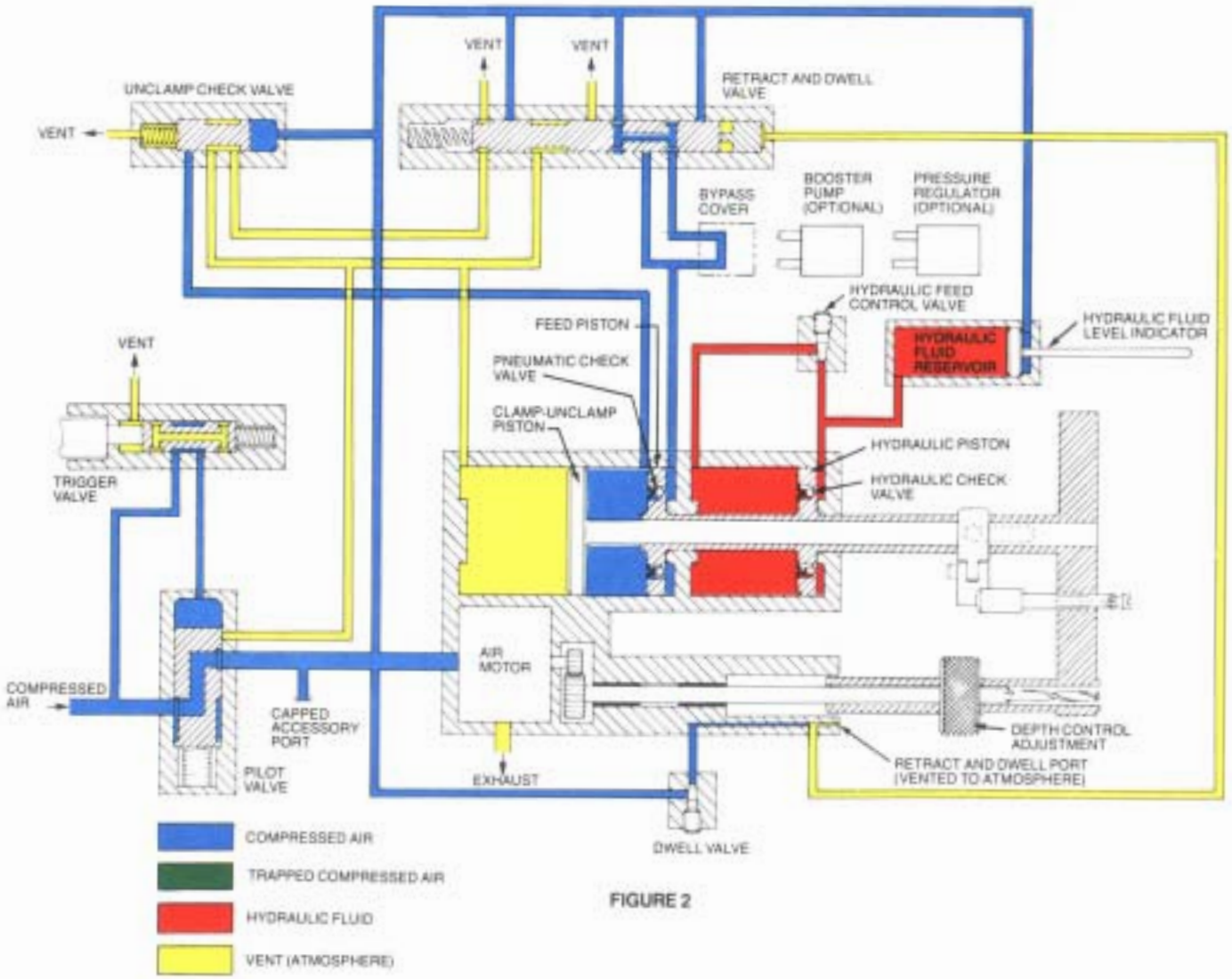


FIGURE 2

3. DIAGRAM OF AIR AND HYDRAULIC SYSTEMS AT PRE-SET CUTTER DEPTH AND START OF RETRACT. Trigger depressed, air motor running, collet clamped, cutter continues feeding until depth control adjustment covers retract and dwell port, shifting retract and dwell valve, initiating rapid cutter retract.

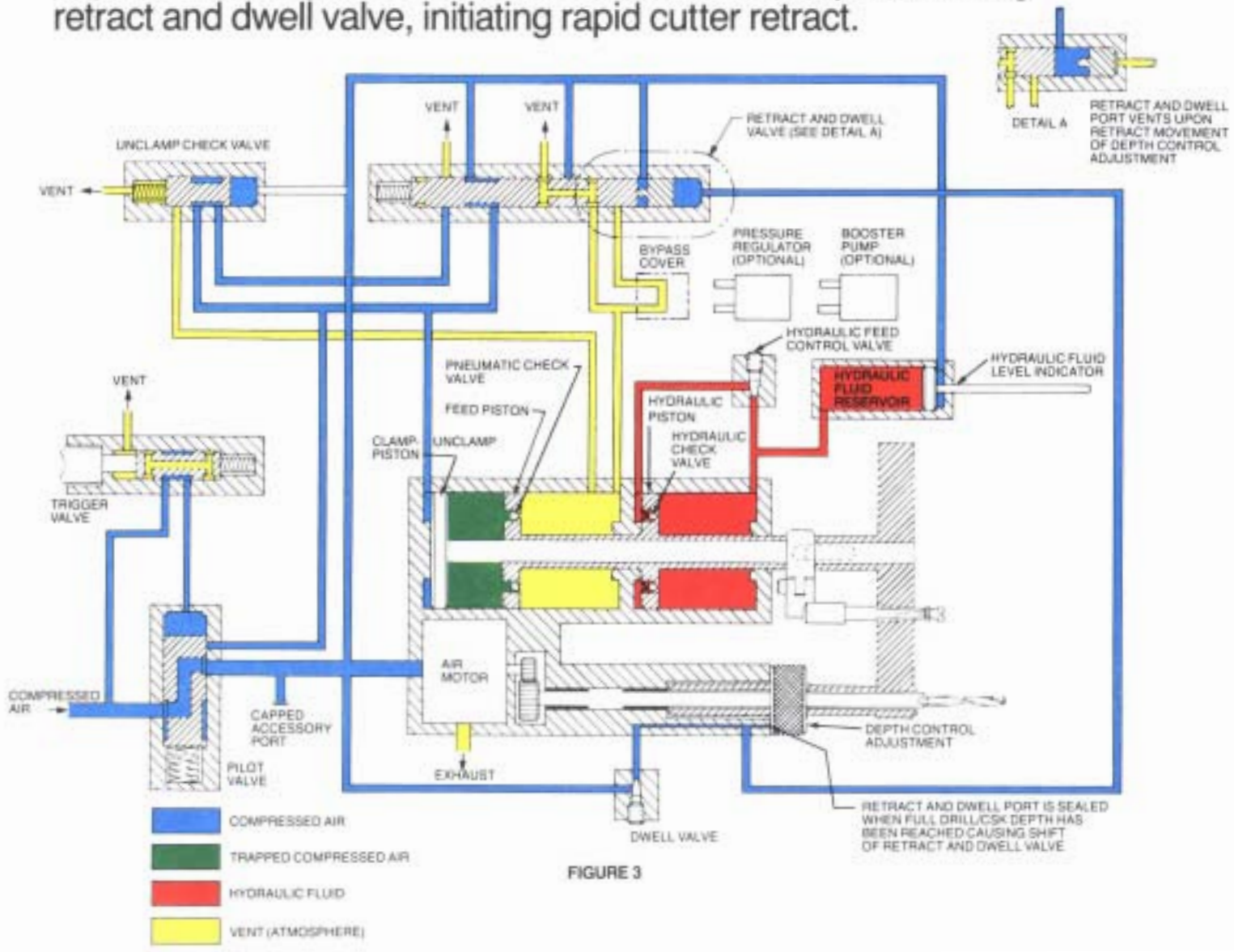


FIGURE 3

4. DIAGRAM OF AIR AND HYDRAULIC SYSTEMS AT COMPLETION OF RETRACT STROKE. Trigger depressed, collet clamped, air motor running.
NOTE: Release trigger causes shifting of pilot, clamp-unclamp and retract valves, collet unclamps and air motor stops (See Figure 1).

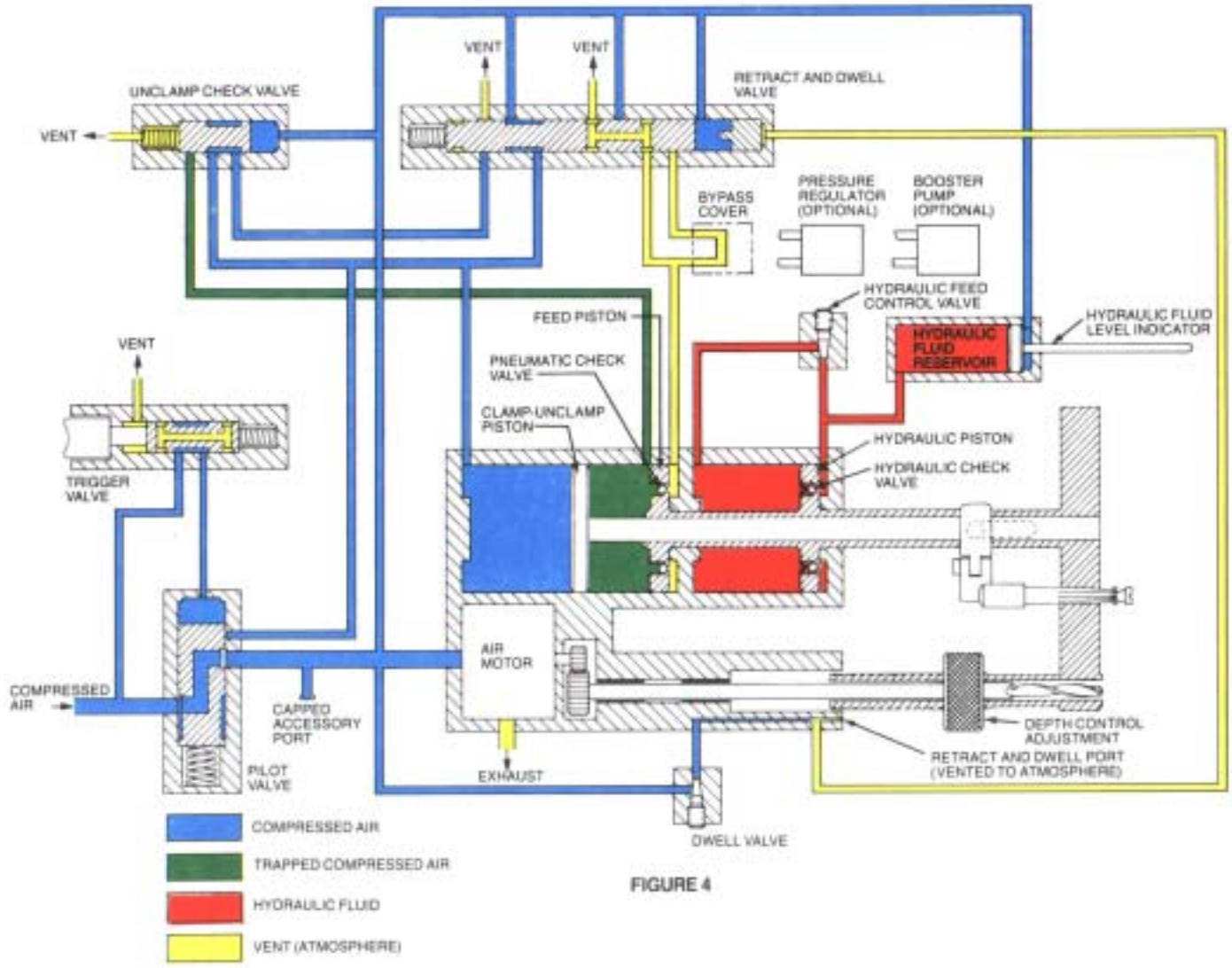
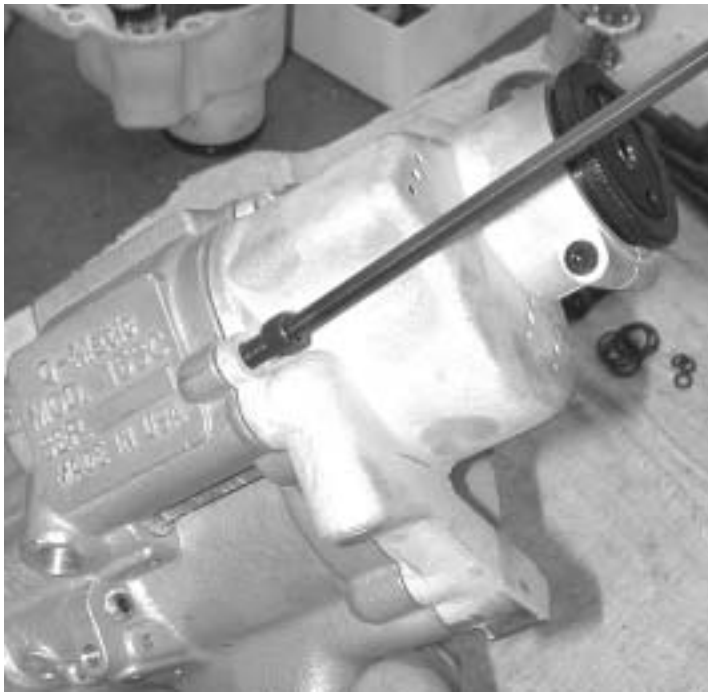


FIGURE 4

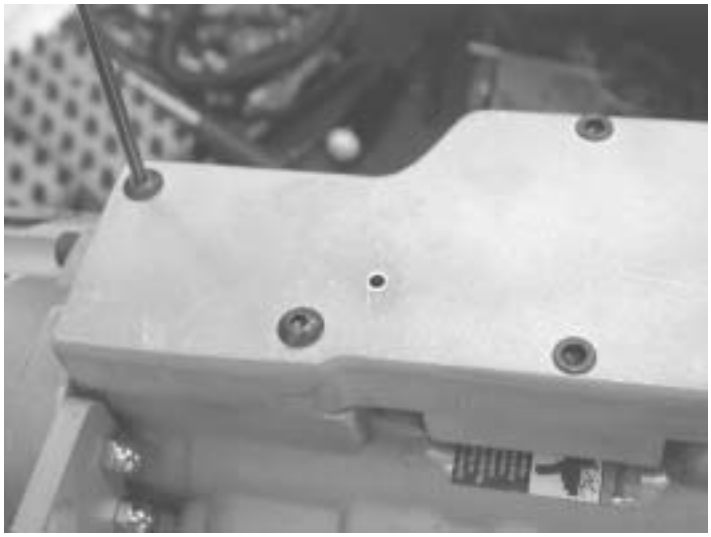
I. Backhead Disassembly



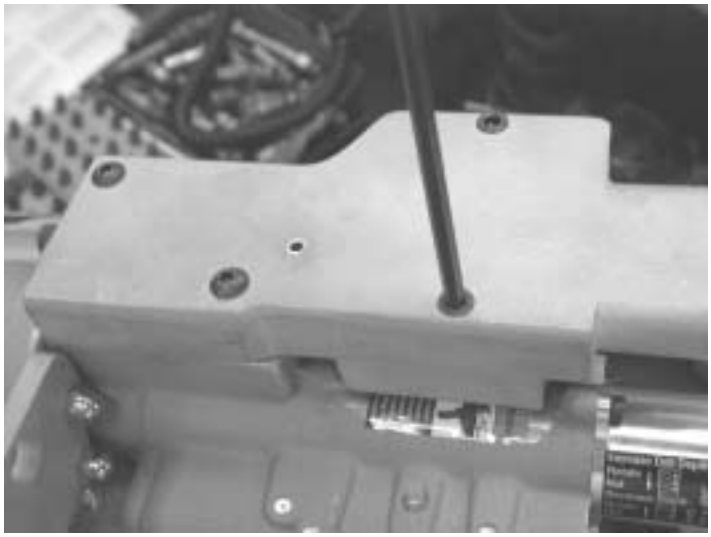
1. Remove four 1/4-20 cap screws.

2. Pull backhead with spindle attached straight out of tool. NOTE: Three O-rings in recessed cavities should remain in place in backhead mating surface.

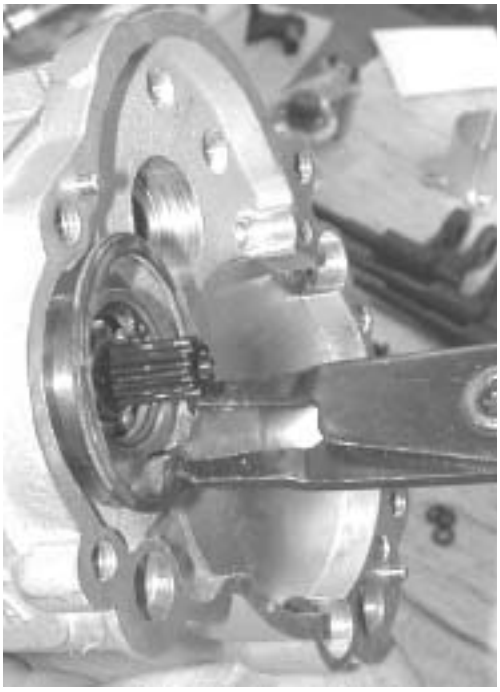
II. Muffler & Air Motor Disassembly



1. Remove rear two 5/32" hex head cap screws and remove muffler subassembly.



2. Remove all four 5/32" hex head cap screws to remove and disassembly muffler subassembly.

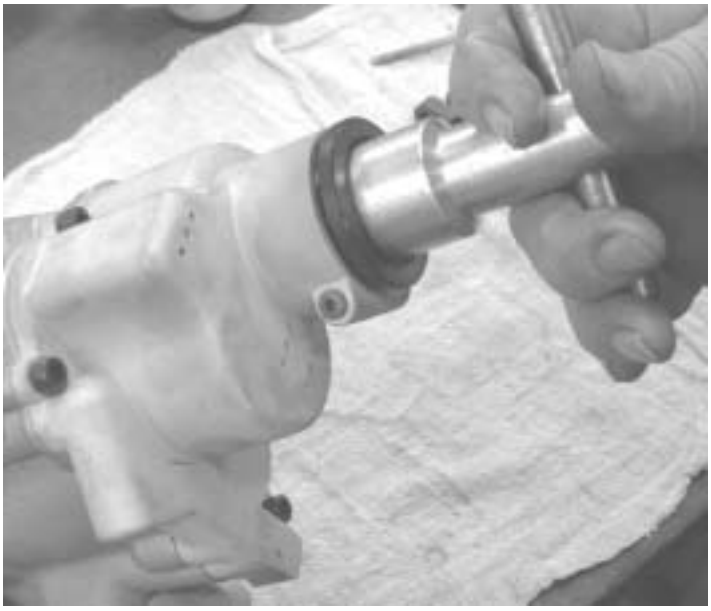


3. Remove retainer ring that holds in motor.

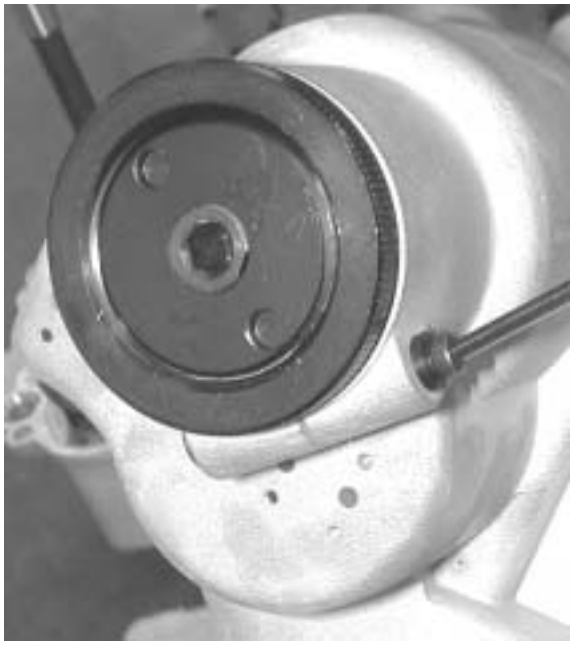
4. Tap housing gently on surface to remove air motor. The complete motor includes rotor with blades, cylinder, and front and rear bearing plates. The exhaust slots on the should be indexed 180 degrees away from the exhaust on the housing when being placed back into the tool.

III. Spindle Adjustment Disassembly

NOTE: Spindle adjustment disassembly is necessary only to service bearings and to change spindle. Otherwise, the backhead assembly can be removed intact to service other internal assemblies, such as the air motor.

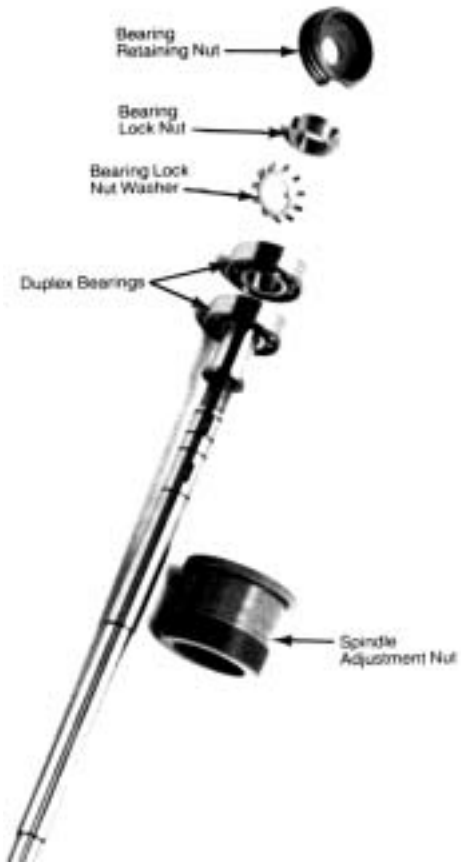


1. Using suitable spanner wrench to unscrew bearing retaining nut.



2. Use hex wrench to loosen and remove tapered locking screw in rear housing.

3. Unscrew spindle adjustment nut and remove nut with spindle.



4. Tap spindle adjustment nut to remove spindle and duplex ball bearings.

5. Unscrew bearing lock nut and bearing lock nut washer with special bearing lock nut assembly tool 623075.

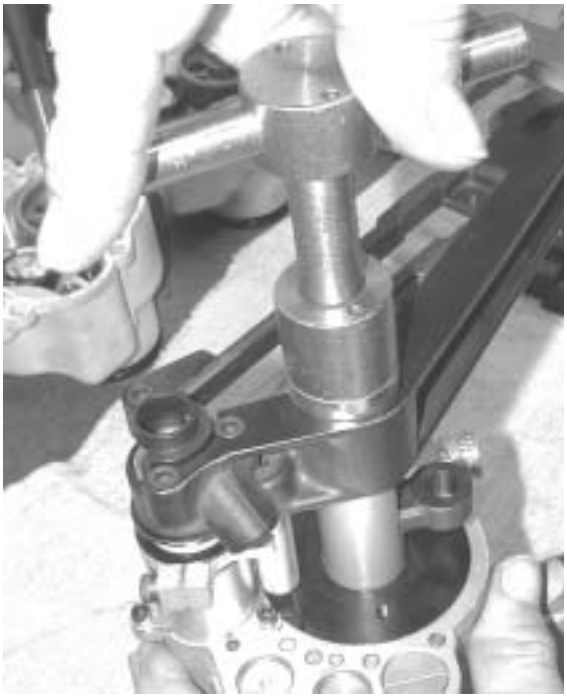
6. To remove spindle gear, remove retaining ring and slide gear off spindle.

NOTE: It may be necessary to remove four socket cap screws which retain gear set before removing spindle gear.

NOTE: To reassemble, 1st duplex ball bearing must seat firmly on spindle shoulder. Add 2nd ball bearing back-to-back with part number on bearings facing away from each other. Then add bearing lock washer and bearing lock nut. Tighten with special tool until inner race seats solid. Screw in bearing adjustment nut and bearing retaining nut and tighten until nut seats solid.

NOTE: Bearing lock nut and bearing retaining nut must be seated solidly to prevent end ;lay in spindle and cutter.

IV. Quill & Pressure Foot Removal



1. Remove pressure foot nut with appropriate spanner wrench or with special pressure foot nut tool 623014.

2. Pull pressure foot forward to remove quill and pressure foot from tool housing and feed sleeve.
NOTE: It is not necessary to remove the backhead and gear assembly to replace or service the quill and pressure foot.

V. How to Change Quills

1. Follow quill and pressure foot disassembly instruction in IV above.
NOTE: If tool is equipped with template boss, remove three socket cap screws and remove template boss.

2. Loosen depth control clamp.

3. Unscrew depth adjustment nut and slide off end of quill.

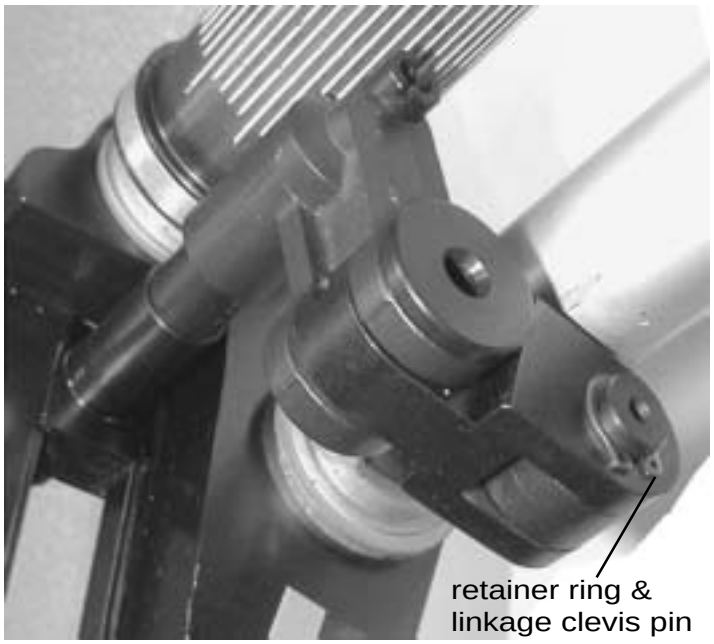
4. Unscrew quill from pressure foot.

5. To reassemble, install spiral lock retaining ring in groove provided above threads on large diameter of quill.

NOTE: The spiral lock retaining ring must be wound to follow the threads in quill so that the spiral lock ring will not unwind when quill is threaded into pressure foot. Install spacer.

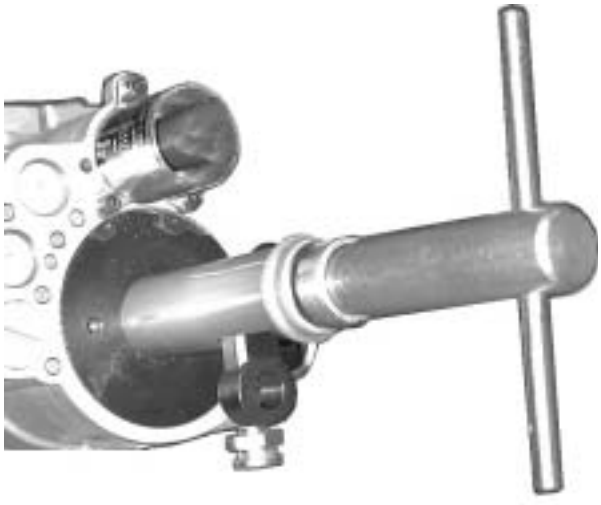
6. To replace spindle, follow step 3 to remove spindle adjustment assembly. Install appropriate spindle for cutter to be used and reassemble.

VI. Feed Clamp Disassembly



NOTE: Follow instruction in IV to remove quill and pressure foot.

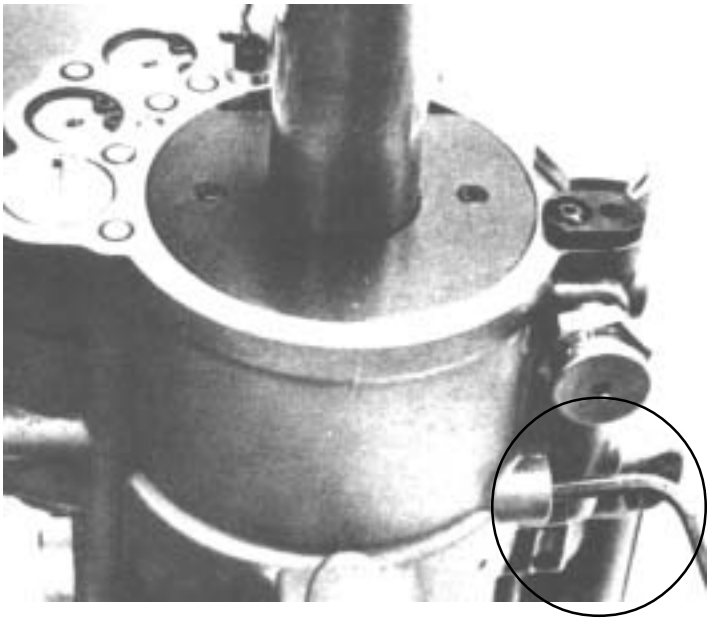
1. Remove retainer ring 812231 and linkage clevis pin 625649.



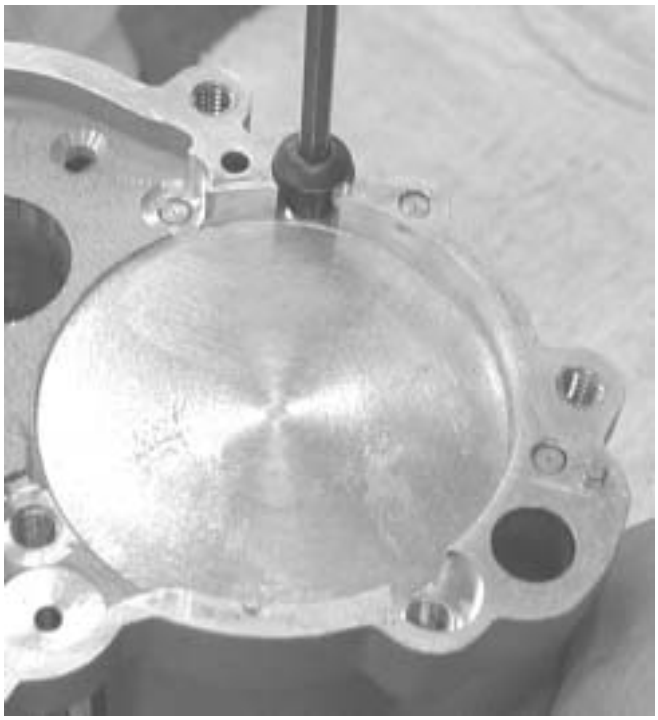
2. With air connected, unscrew pull rod bushing 625663.

3. With rod push in on the pull rod to remove pressure on lift finger and the lift finger will come out.

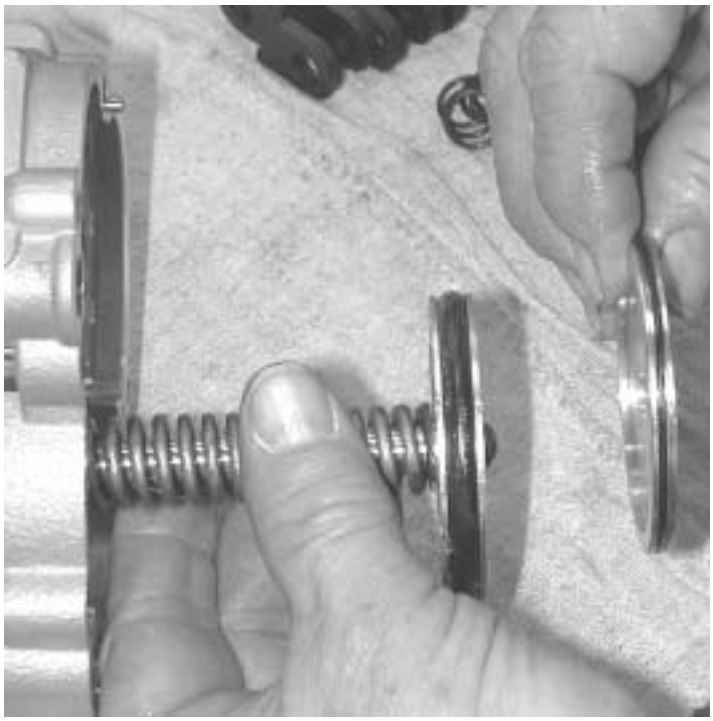
4. The following steps apply only if the hydraulic system requires servicing.



5. Remove bleed port screw from side of tool. Remove 1/8" steel ball from bleed port with small magnet. Bleed hydraulic fluid by pulling and pushing feed sleeve. Fluid will run out of opening.

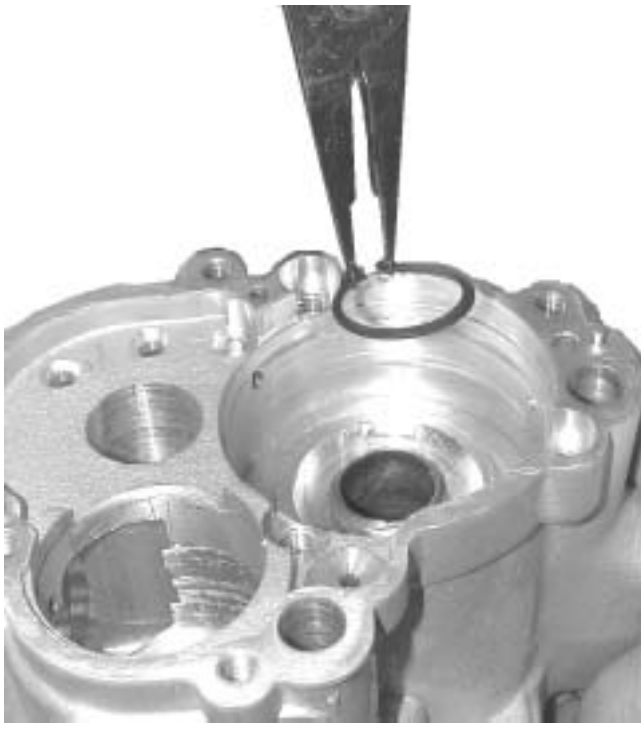


6. Turn tool around and remove three button head screws which hold the rear bulkhead in place.



7. Insert rod through end of feed sleeve and push to remove rear bulkhead with clamp/unclamp piston and collet spring assembly.

NOTE: Examine O-ring on rear bulkhead and replace if damaged.



8. Expand and remove first retaining ring from feed sleeve.

9. Remove rear feed piston using internal pliers. Hold piston on internal diameter pull piston out.

10. Expand and remove second retaining ring from feed sleeve.

11. Compress front bulkhead retaining ring.

12. Pull front bulkhead and feed sleeve out.

13. Compress and remove large retaining ring located at the rear of tool from large diameter bore of cavity. Be careful not to score or scratch inner bore.

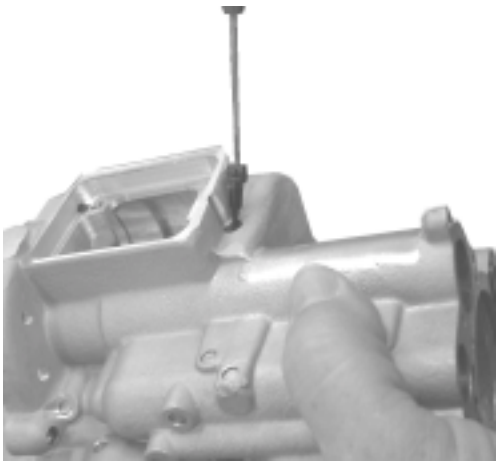
14. Screw threaded end of bulkhead removal tool 622849 into threaded hole in air/hydraulic bulkhead and pull to remove from rear of tool. Read notes below.

NOTE: The O-rings on the outer diameter of the air/hydraulic bulkhead must pass by two retaining ring grooves. Before reinserting the bulkhead, pack the retaining ring grooves with O-ring lubricant to prevent O-ring damage.

NOTE: A small orifice on the right side of the tool housing is provided to check the condition of the O-rings on the air/hydraulic bulkhead. Air seepage indicates a damaged O-ring on the air side; hydraulic fluid seepage indicates O-ring damage on the fluid side.

NOTE: One large retaining ring will remain in the inner bore. It should not be necessary to remove this ring.

VII. Dwell Valve Assembly



1. Remove needle valve from housing with hex wrench.

VIII. Disassembly of Feed Rate Adjustment Valve

1. Unscrew feed adjustment body with wrench and remove.

2. Unscrew pipe plug with hex wrench and remove.

3. Push out feed rate adjustment valve and screen with wrench.

NOTE: Exercise caution when disassembling so that no small component enters into other hydraulic openings or cavities.

4. Use installation tool 624763 for installation.

IX. Disassembly of Unclamp Check Valve

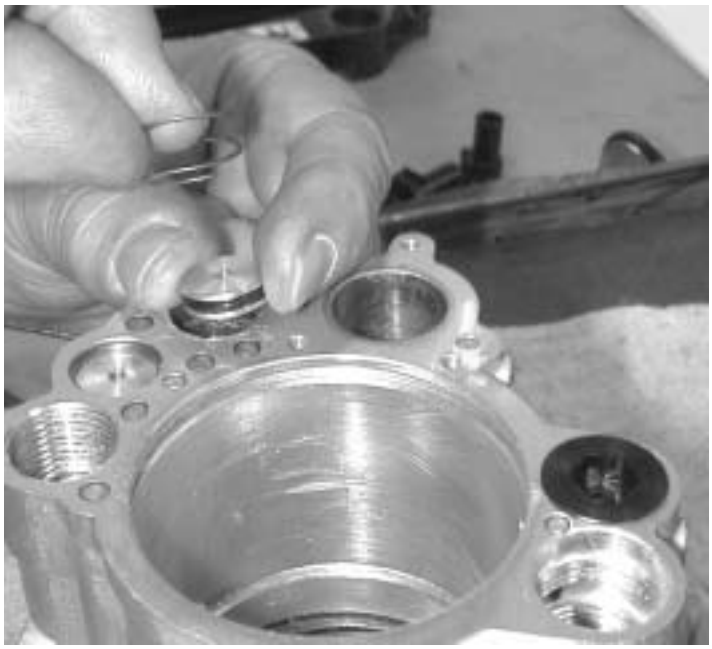
1. Remove retaining ring and valve retaining plug. Remove spool and spring.

2. Lift spool and spring out of cavity and place in clean area.

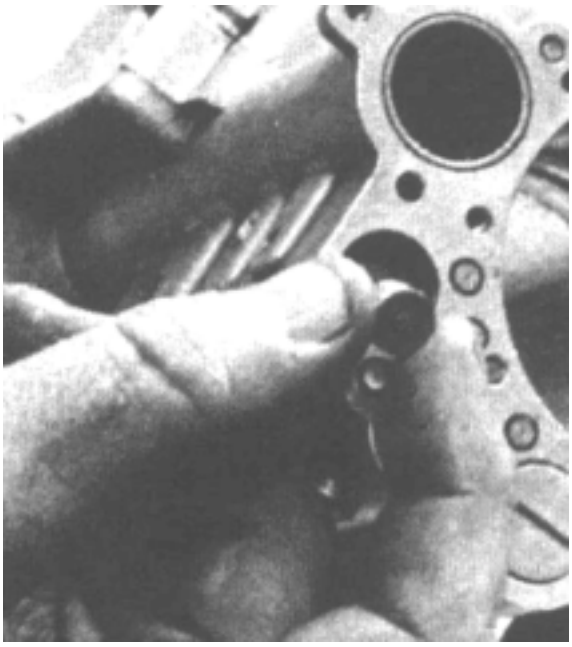
3. Using removal and installation tool 632424, remove valve sleeve. Carefully inspect O-rings for damage and replace if necessary.

NOTE: When installing sleeve use O-ring lubrication.

X. Retract and Dwell Valve Disassembly



1. Remove retaining ring on valve retaining plug.



2. Lift out latching spool.

3. Remove retract and dwell valve spool and spring.

4. Using removal and installation tool 632424. Remove sleeve.

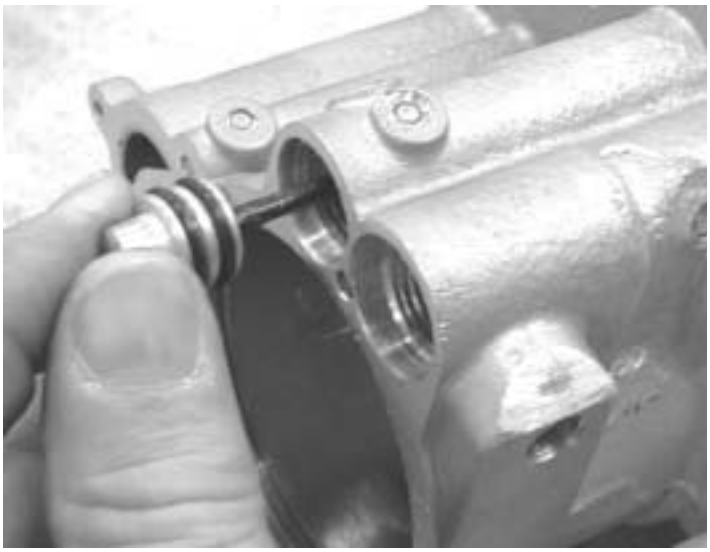
5. When reassembling, apply O-ring lubricant liberally to prevent damage to O-rings as they are pushed past ports on the inside cavity. NOTE: Spring on end of spool should be retained in hole in end of spool with grease during reassembly.

XI. Hydraulic Fluid Reservoir Disassembly

1. Unscrew the reservoir plug.

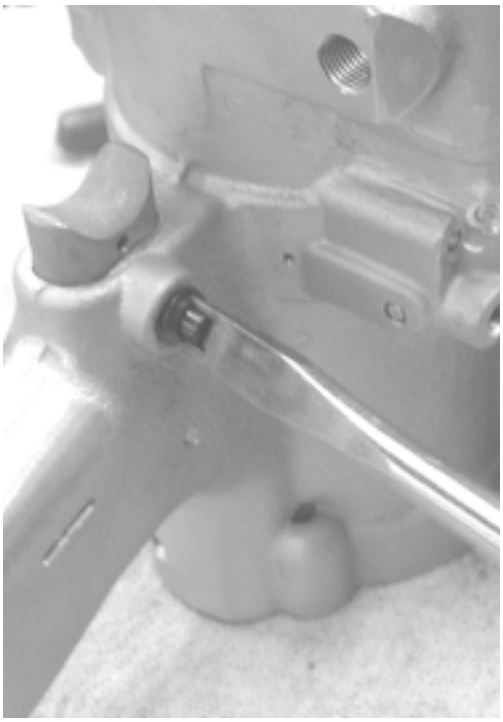
2. Remove set screw.

3. Remove oil indicator guide from rear of tool. Remove piston and rod assembly from the front of the housing with needle nose pliers. CAUTION: Do not score of scratch inside of bore with driver.

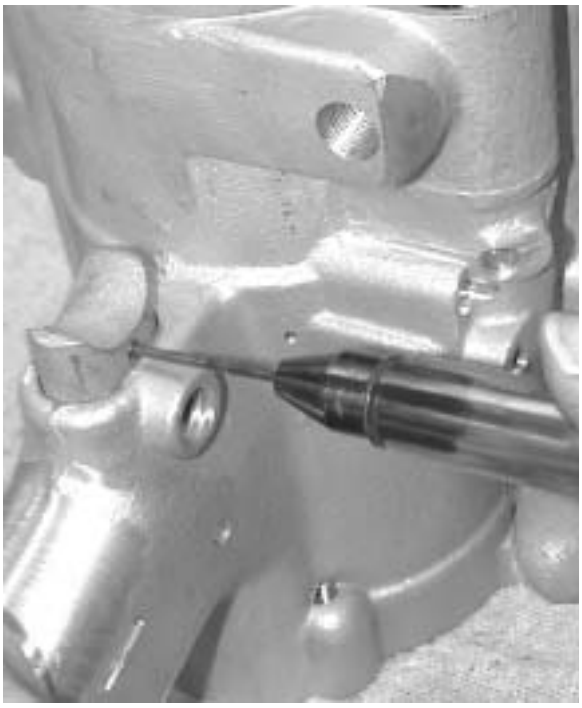


4. Disassembly and reassembly of the oil indicator guide must be inserted from the rear of the tool. The indicator piston and rod assembly must be inserted from the front of the tool as shown. Failure to follow instructions will result in damaged O-rings. Remove indicator piston with needle nose pliers.

XII. Trigger Disassembly



1. Use special Trigger Lock Assembly Tool 623015 to remove trigger lock by unscrewing from handle. NOTE: Use Loctite on threads when reassembling trigger lock.



2. Loosen and remove set screw in trigger and remove trigger.

3. Remove the retaining ring from the trigger bore.

4. Lift out trigger spool and sleeve.
5. Remove spring from trigger cavity.

XIII. Pilot Valve Disassembly

1. Remove inlet bushing.

2. Remove spacer.

3. Insert long 8-32 screw into tapped hole provided in base of pilot spool and lift out. NOTE: Be careful not to bend pilot spool when remving or inserting. A bent spool will cause the tool to malfunction and will require spool replacement.

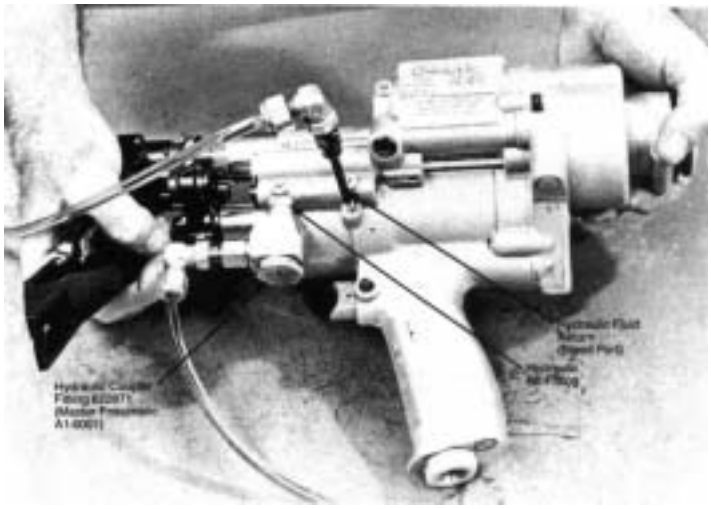
Filling & Bleeding the Hydraulic System

WARNING: Disconnect air-supply before servicing.
Clamp mechanism moves when connecting or removing air supply.
Keep hands and fingers away from clamping and feed mechanism.

The 120SC-112 drill hydraulic system will periodically require filling and/or bleeding. If the oil level indicator is near the "Add Fluid" mark, replenish the system using Mobil D.T.E. light or equivalent hydraulic fluid.

FILLING
Connect the hydraulic fluid source to the tool using filler fitting number 622871 or the new 624235/624942 filler assembly. The fluid supply pressure should be 100-150 P.S.I. so the tool's internal check valve can be opened. Start the hydraulic fluid source and fill the tool until the oil level indicator shows full. Bleeding the tool should not be necessary if air has not been introduced into the system. Disconnect the tool from the fluid source and return to service.

BLEEDING
Remove the 10-32 set screw and the .125 diameter steel ball from the bleed port. This bleed port is located on the lower left hand side of the main housing (see section C-C items 59 and 101 on page 27 for more detail). Open feed control valve to the fastest setting. This allows the fluid to flow unrestricted. Set the depth stop to the longest stroke. This must be done to completely bleed the air from the hydraulic fluid.
Attach the filler fitting 622871 or the new 624235/624942 filler assembly to the hydraulic fill fitting. Thread the return stem part number 624235 into the 10-32 bleed port and hand tighten. Attach air line to tool and turn on air supply. Turn on hydraulic pump to circulate fluid. With the hydraulic fluid circulating though



the tool, depress the trigger and cycle the tool several times to remove any air from within the tool. Visually check the clear return line for any air bubbles. When no bubbles are seen disconnect the air supply. Turn off the hydraulic supply and remove the filler fitting and return stem from the tool. Reinstall the .125 diameter steel ball and 10-32 set screw into the bleed port and tighten. Test the tool for proper feed control before returning to service.

Tooling Adjustments

WARNING: Disconnect air-supply before servicing.
Clamp mechanism moves when connecting or removing air supply.
Keep hands and fingers away from clamping and feed mechanism.

Spindle Stroke Adjustment
Loosen spindle adjustment lock, then turn spindle adjustment knob. Clockwise rotation advances cutter forward; counterclockwise rotation returns cutter. Correct cutter point position is flush with face of template boss. When cutter is properly adjusted, lightly tighten spindle adjustment lock to hold adjustment.

Micrometer Depth Adjustment
Loosen adjustment clamp, and rotate depth adjustment nut. Clockwise rotation decreases depth; counterclockwise increases depth. Graduations scribed on barrel are in .001" increments. When proper depth is achieved, lightly tighten adjustment clamp.

Feed Rate Adjustment
With appropriate hex wrench, turning feed rate adjustment screw counterclockwise, increases feed rate. Turning the screw clockwise decreases feed rate. Feed rate can be measured by using the following formula:

$$\text{Time} = \frac{60 \text{ seconds}}{\text{Feed Rate} \times \text{Spindle Speed (rpm)}}$$

Dwell Adjustment
Insert appropriate size Allen wrench into dwell adjustment valve opening. Rotate wrench clockwise until valve seats lightly. Rotate valve counterclockwise 1/2 turn to obtain base setting.

Note: If adjustment valve is opened too far, drill motor will not cycle, and feed cycle cannot be obtained. To correct, turn valve clockwise to seat valve and set according to instructions.

If valve is closed too far, retract cycle cannot be obtained. To correct, turn valve counterclockwise and set according to instructions.

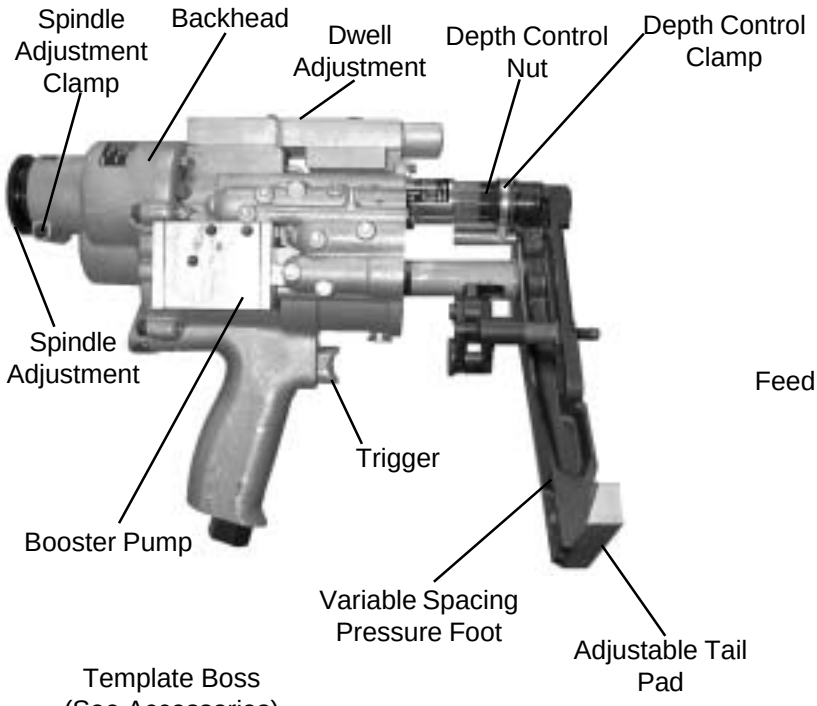
Closing valve increases countersink dwell time; opening valve decreases countersink dwell time.

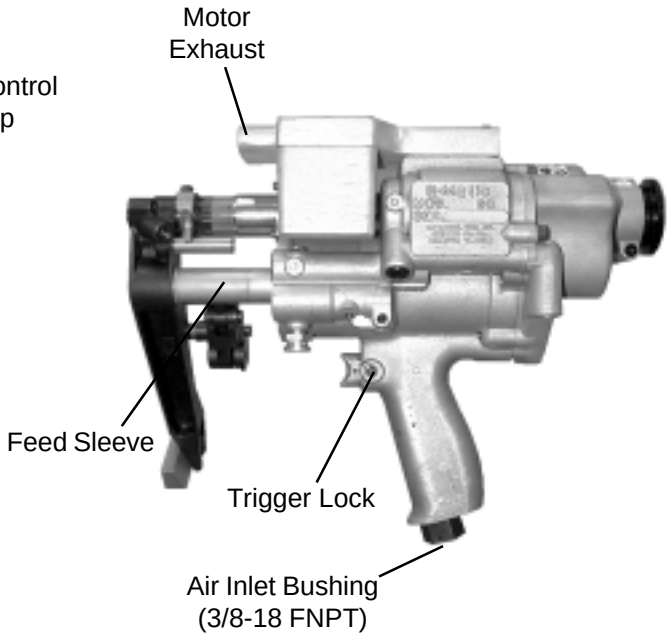
Tail Pad Adjustment
The purpose of the tail pad is to compensate for slight surface curvature of the workpiece being drilled and to assure that the hole being drilled is perpendicular to the surface.

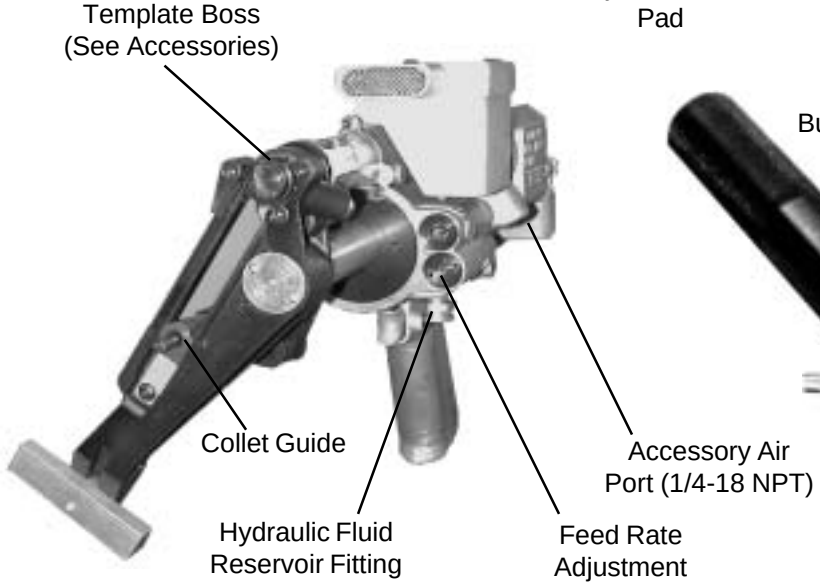
To adjust to a flat plane for drilling flat surfaces, use a straight edge between the tail pad and face of template boss and adjust the tail pad until the straight edge is flush with the face of the template boss.

An optional tail pad is available for high curvature surfaces. (See Accessories page 35 for additional information.)

Major Tool Components

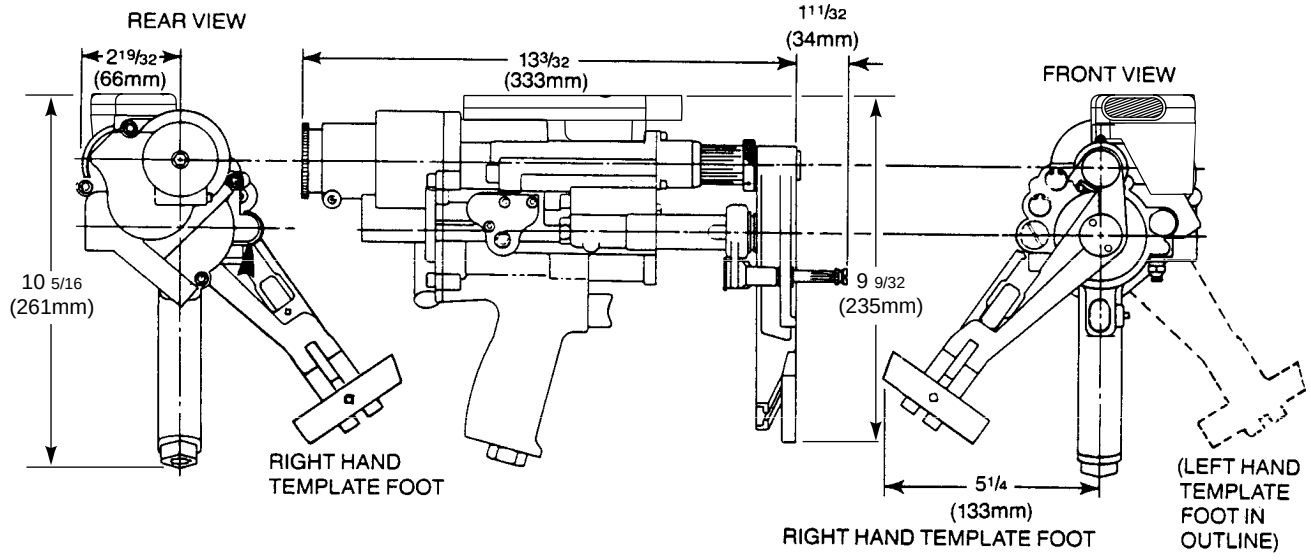






Special Tools

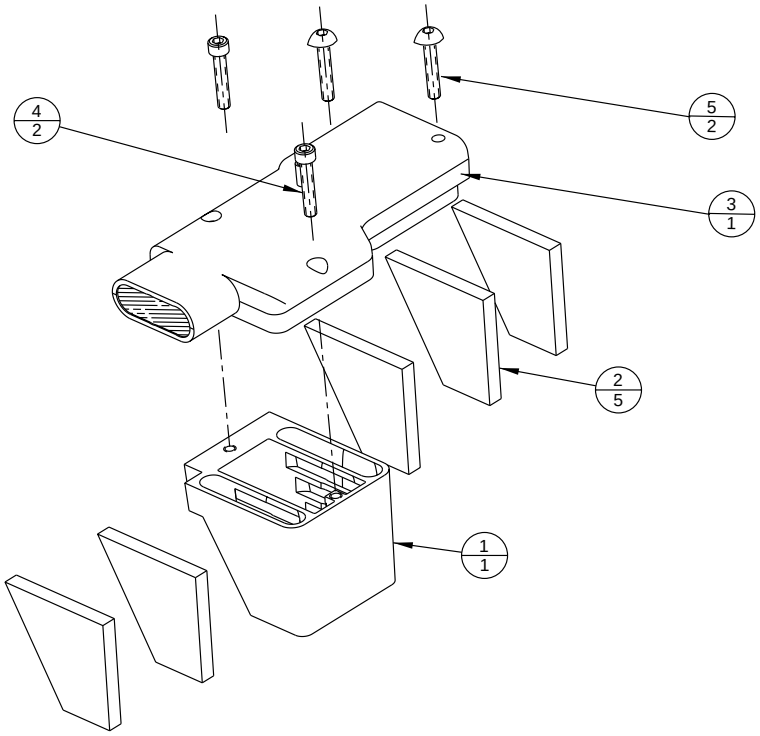
Feed Stroke: 1 1/8″ (26mm); Clamp Stroke: 1/2″ (13mm)



TROUBLE SHOOTING

SYMPTOM	REASON	SOLUTION
Air motor and/or clamp and feed functions do not start when trigger is depressed.	Trigger or pilot valves clogged with foreign matter.	Remove trigger and pilot valves (separately) and inspect for rust or debris. Inspect O-rings and replace if necessary,
Air motor does not run when trigger is depressed, but feed and clamp functions properly.	Gears damaged or jammed with debris.	With air line disconnected check for free spindle rotation with hex key wrench in end of spindle. Remove backhead, clean and inspect gears for damage.
	Foreign matter in motor inlet.	Remove motor and clean debris from motor inlet.
	Broken rotor blades, rotor or gear bearings.	Remove motor and inspect rotor blades and bearings. Replace if necessary.
Air motor “idles” when trigger valve is released.	Pilot valve or retract and dwell valve sticky (not fully reset), or bad O-ring.	Remove and check valves for debris and free movement of spool. Inspect O-rings, lubricate and reassemble.
	Leaking O-ring on air motor rear bear--ing support.	Remove and inspect O-rings. Replace if necessary and reassemble.
Motor runs, but clamp & feed functions do not start.	Unclamp check valve doesn’t shift when trigger is depressed.	Remove unclamp check valve and inspect for debris, free movement and damaged O-rings. Lubricate and reassemble.
Motor runs, clamps but doesn’t feed.	Feed control valve “closed”	Back off feed control valve counterclockwise until feed commences.
	Debris in the hydraulic system.	Remove two bleed ports. One in front enclosure and one on left side, and bleed hydraulic system until fluid is clear.
Lunge during feed or variation in feed rate.	Air in hydraulic system.	Back feed control valve two turns from seat, and bleed as above.
	Persistent air in hydraulic system.	If air in hydraulic continues to be a problem, remove hydraulic reservoir piston and check or replace O-rings.
Tool doesn’t retract at end of feed stroke.	Dwell valve seated too tightly.	Back dwell valve off from seat 1/8 turn to 1 & 1/2 turn.
	Retract and dwell valve doesn’t shift.	Remove retract and dwell valve and inspect for debris, free movement and damaged O-rings. Lubricate and reassemble.
	Depth control adjusted out of the max. range of the tool.	Readjust depth control nut within the feed stroke of the tool (ref.: 1.10 max. stroke).
Tool retracts shortly after trigger depressed.	Dwell valve opened too far off of seat.	Turn dwell valve clockwise (should be 1/8 to 1&1/2 turns of seat).
Tool “pulses” on retract (rapid ‘‘feed retract-feed retract”).	Damaged O-rings on retract and dwell valve.	Remove retract and dwell valve, inspect O-rings and replace as necessary. Lubricate and reassemble.

Muffler Subassembly - 641055



ITEM	PART NO.	PART NAME	QTY.
1	632130	BOX, MUFFLER	1
2	632126	ELEMENT, MUFFLER	5
3	632132	PLENUM	1
4	619995	SCREW, SHC (10-24UNC-3A)	2
5**	632125	SCREW, HSBHC (10-32UNF X 1.250)	2

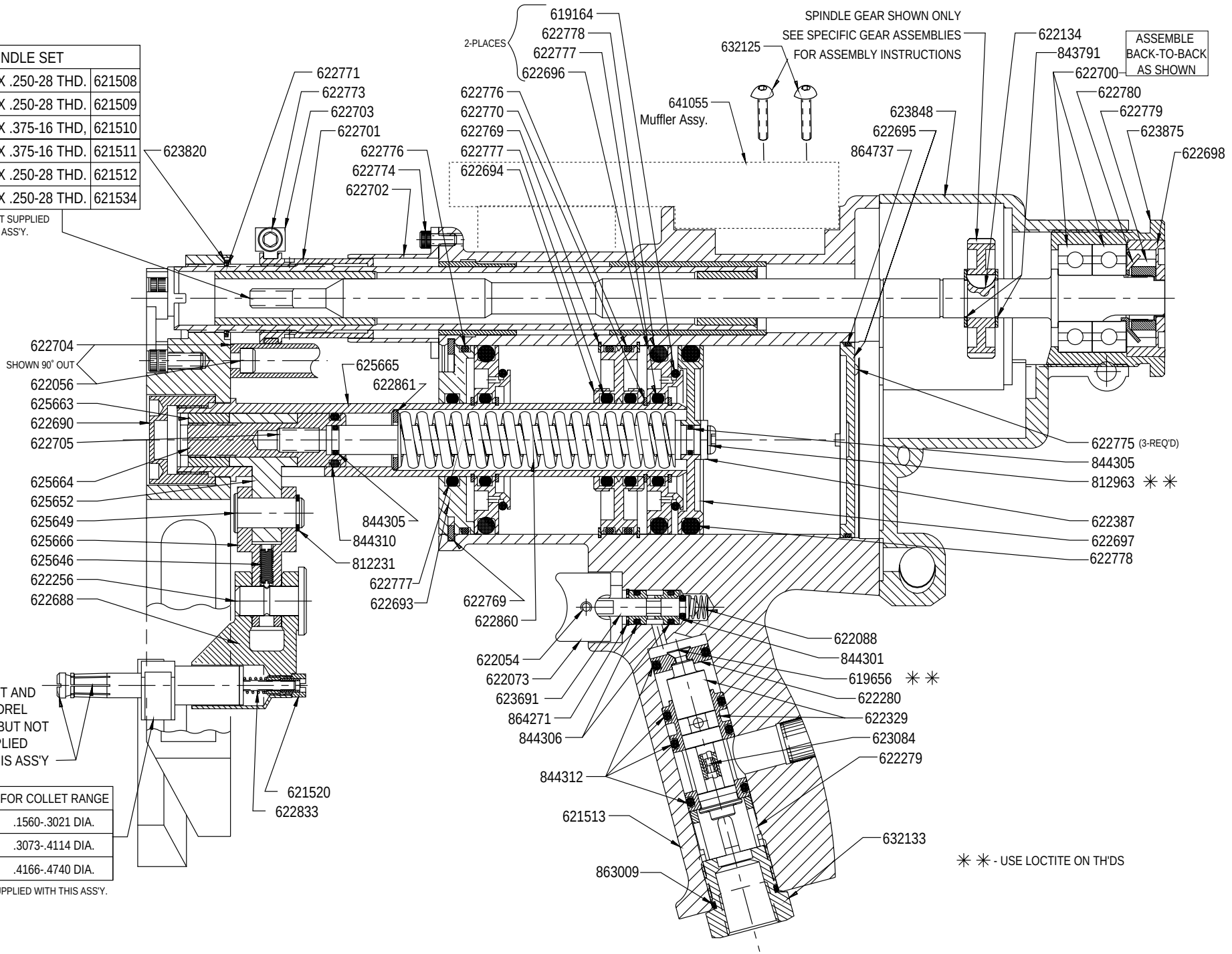
** PARTS NOT INCLUDED IN SUBASSEMBLY: 632125 - SCREWS

15SC Upgrade to 120SC Subassembly - 641099

Part No.	Name of Part	Quantity
622279	Spacer, Pilot Valve	1
622329	Subassembly, Pilot Valve	1
624973	Fitting	1
629556	Subassembly, Gear Plate Spacer	1
632125	Screw, HSBHC (10-32UNF X 1.250)	2
632128	Screw, Indexing	1
632133	Bushing, Inlet	1
632178	Valve, In-line Non return	1
641055	Subassembly, Muffler	1

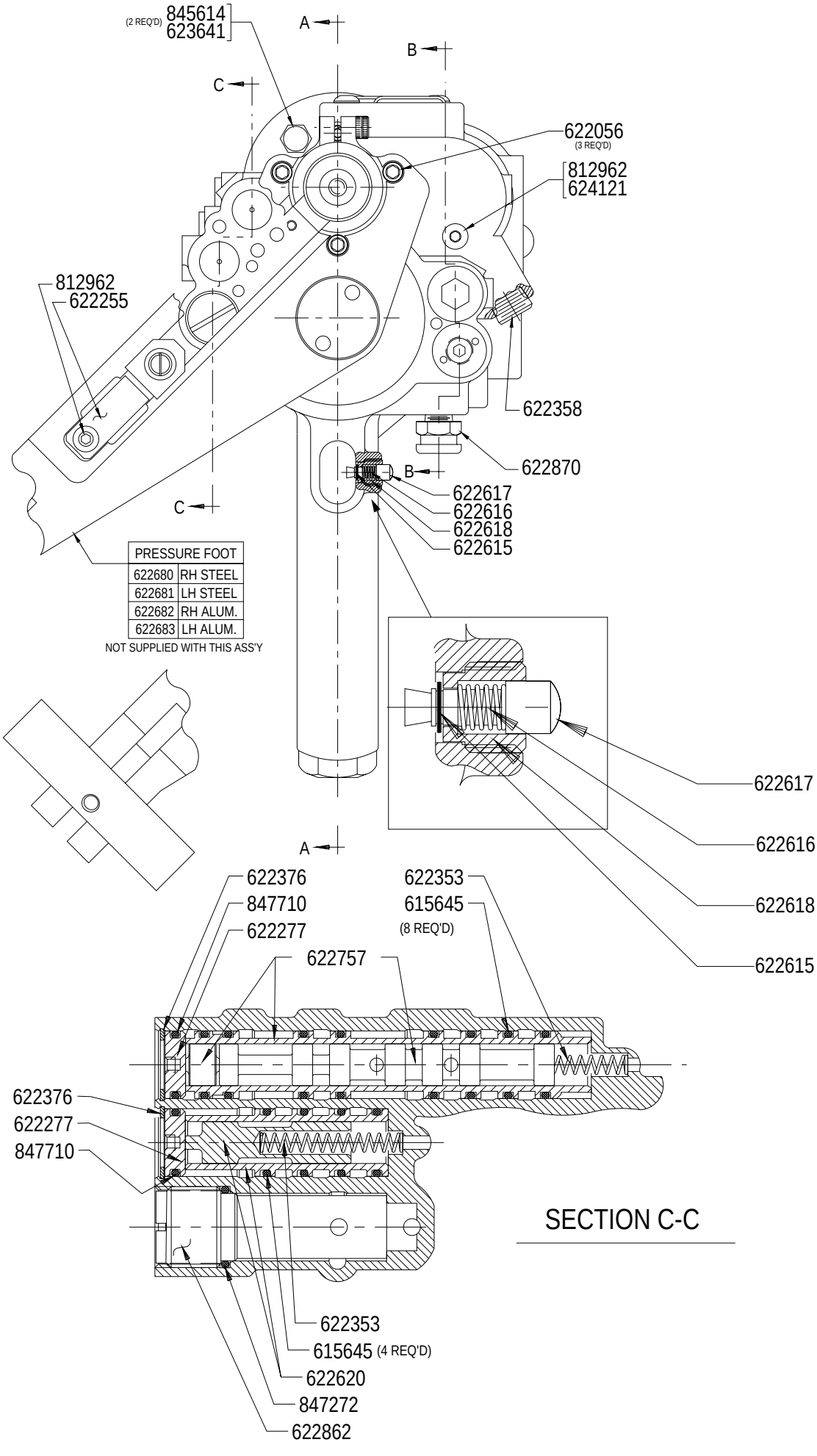
SPINDLE SET	
.375 SHANK X .250-28 THD.	621508
.500 SHANK X .250-28 THD.	621509
.500 SHANK X .375-16 THD,	621510
.625 SHANK X .375-16 THD.	621511
.625 SHANK X .250-28 THD.	621512
.375 SHANK X .250-28 THD.	621534

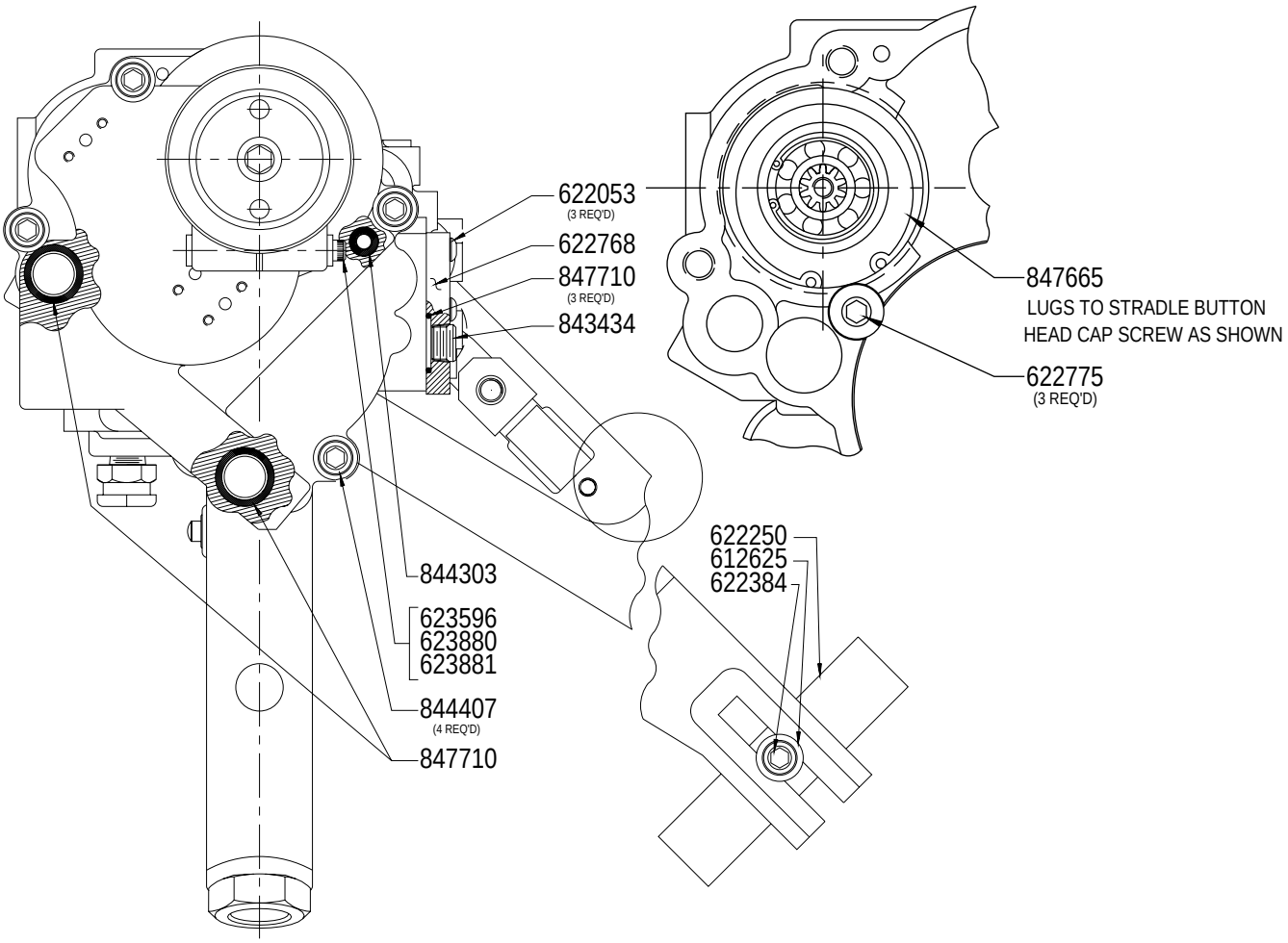
SHOWN BUT NOT SUPPLIED WITH THIS ASS'Y.

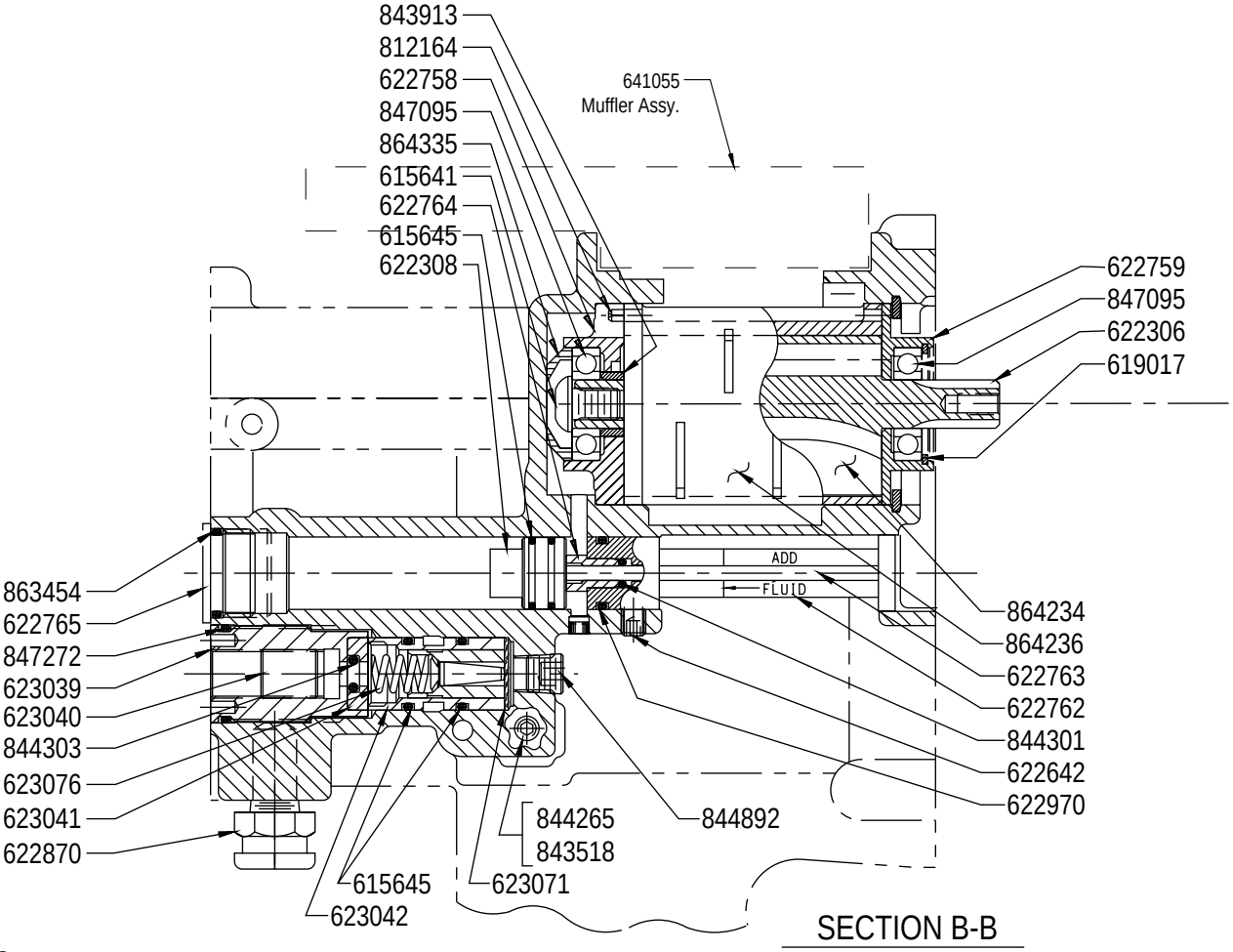


COLLET GUIDE	FOR COLLET RANGE
622252	.1560-.3021 DIA.
622253	.3073-.4114 DIA.
622254	.4166-.4740 DIA.

SHOWN BUT NOT SUPPLIED WITH THIS ASS'Y.


(2 REQ'D) 845614
623641
A
B
C
622056
(3 REQ'D)
812962
624121
812962
622255
622358
622870
B
622617
622616
622618
622615
C
PRESSURE FOOT
622680 RH STEEL
622681 LH STEEL
622682 RH ALUM.
622683 LH ALUM.
NOT SUPPLIED WITH THIS ASS'Y
622617
622616
622618
622615
A
622376
847710
622277
622757
622353
615645
(8 REQ'D)
622376
622277
847710
622353
615645 (4 REQ'D)
622620
847272
622862
SECTION C-C


622053
(3 REQ'D)
622768
847710
(3 REQ'D)
843434
847665
LUGS TO STRADLE BUTTON
HEAD CAP SCREW AS SHOWN
622775
(3 REQ'D)
622250
612625
622384
844303
623596
623880
623881
844407
(4 REQ'D)
847710


843913
812164
622758
847095
864335
615641
622764
615645
622308
641055
Muffler Assy.
622759
847095
622306
619017
ADD
FLUID
863454
622765
847272
623039
623040
844303
623076
623041
622870
864234
864236
622763
622762
844301
622642
622970
844892
844265
843518
623071
615645
623042

SECTION B-B

PARTS LIST

Part No.	Name of Part	Qty.	Part No.	Name of Part	Qty.
612625	WASHER; PLAIN	1	622773	SCREW; SHC	1
615641	SCREW; BHC	1	622774	SCREW; SHC	3
615645	RING; O	16	622775	SCREW; BHC	3
619017	RING; RETAINING	1	622776	RING; O	3
619164	RING; O	2	622777	RING; O	5
619656	SCREW; SFCHC	1	622778	RING; O	3
621513	(MFG) ASSY; HANDLE,Q-MATIC 15SC DRILL	1	622779	LOCKNUT	1
621520	SUBASSY; BUSHING	1	622780	WASHER; LOCK	1
622026	VALVE; NEEDLE	1	622781	PAD; MUFFLER	1
622053	SCREW; BHC (6-32 X .500 LG)	3	622833	COLLET SPRING	1
622054	SCREW; SET	1	622860	SPRING;COMPRESSION	1
622056	SCREW; SHC	4	622861	WASHER	1
622073	TRIGGER	1	622862	NON-REGULATING PLUG	1
622088	SPRING	1	622870	HYDRAULIC FITTING	1
622134	KEY	1	622970	RING; O	1
622250	PAD; PRESSURE	1	623039	BODY; FEED ADJUST	1
622252	COLLET GUIDE .1560-.3021	1	623040	SCREW; FEED RATE ADJUST	1
622253	COLLET GUIDE .3073-.4114	1	623041	INSERT; BODY	1
622254	COLLET GUIDE .4166-.4740	1	623042	ASSY; FEED CONTROL VALVE	1
622255	COLLET GUIDE CLIP	1	623071	FILTER	1
622256	LIFT LEVER PIN	1	623076	SPRING; COMPRESSION	1
622277	PLUG	2	623084	SCREW; ORIFICE	1
622279	SPACER	1	623596	SCREW; SHC	1
622280	PISTON	1	623641	ACORN NUT	2
622306	ROTOR	1	623691	TRIGGER VALVE ASSEMBLY	1
622308	PISTON; OIL LEVEL IND.	1	623820	CUP RETAINING RING	1
622329	ASSY; PILOT VALVE	1	623848	BACKHEAD	1
622353	SPRING; COMPRESSION	2	623875	NUT; SPINDLE ADJUSTMENT	1
622358	PIPE; PLUG	1	623880	CLAMP BUSHING	1
622376	RING; RETAINING	2	623881	CLAMP NUT	1
622384	SCREW; SHC	1	624121	GASKET	1
622387	SPACER	1	625649	CLEVIS PIN; LINKAGE	1
622615	RING; RETAINING	1	625652	LIFT FINGER	1
622616	SPRING	1	625663	BUSHING; PULL ROD	1
622617	PIN; TRIGGER LOCK	1	625664	PULL ROD	1
622618	BUSHING; TRIGGER LOCK	1	625665	CLAMP-FEED SHAFT	1
622620	SUBASSY; CHECK VALVE	1	625666	LINKAGE; CLEVIS	1
622642	SCREW	1	632125	SCREW; HSBHC (10-32UNF X 1.250)	5
622680	PRESSURE FOOT; RH STEEL	1	632133	BUSHING; INLET	1
622681	PRESSURE FOOT; LH STEEL	1	812164	PIN; SPRING	1
622682	PRESSURE FOOT; RH ALUMINUM	1	812231	RING; RETAINING	1
622683	PRESSURE FOOT; LH ALUMINUM	1	812962	SCREW; BHC	2
622688	HOLDER; COLLET	1	812963	SCREW; BHC	3
622690	NUT; PRESSURE FOOT	1	843434	PLUG; PRESSURE	1
622693	BULKHEAD; FRONT	1	843518	SCREW; SET	1
622694	BULKHEAD; AIR/HYDRAULIC	1	843791	RING; RETAINING	2
622695	BULKHEAD; REAR	1	843913	COLLAR; ROTOR	2
622696	PISTON; FEED	2	844265	BALL (1/8)	1
622697	PISTON; CLAMP-UNCLAMP	1	844301	RING; O	3
622698	NUT; BEARING RETAINING	1	844303	RING; O	2
622700	BEARING; BALL	2	844305	RING; O	2
622701	NUT; ADJUST DEPTH CONTROL	1	844306	RING; O	2
622702	COVER; DEPTH CONTROL	1	844310	RING; O	2
622703	CLAMP; DEPTH CONTROL	1	844312	RING; O	1
622704	GUIDE; DEPTH CONTROL ADJUST	1	844407	SCREW; SHC	4
622705	SHAFT; CLAMP-UNCLAMP	1	844892	PLUG; PIPE	4
622757	SUBASSY; VALVE	1	845614	SCREW; SFCHC	2
622758	PLATE; REAR BEARING	1	847095	BEARING; BALL	2
622759	PLATE; FRONT BEARING	1	847272	RING; O	2
622760	MUFFLER	2	847665	RING; RETAINING	1
622761	COVER; EXHAUST	1	847710	RING; O	7
622762	GUIDE; OIL LEVEL INDICATOR	1	863009	RING; O	1
622763	ROD; OIL LEVEL INDICATOR	1	863454	RING; O	1
622764	SPACER; OIL LEVEL INDICATOR	1	864234	BLADE; ROTOR	4
622765	PLUG; RESERVOIR	1	864236	CYLINDER	1
622768	COVER	1	864271	SNAP RING	1
622769	RING; RETAINING	3	864335	BEARING CAP	1
622770	RING; RETAINING	4	864737	RING; O	1
622771	RING; RETAINING	1			

MAINTENANCE KIT - 621953

PART NO.	NAME OF PART	QTY.
382370	TOOL BOX	1
622849	ASSEMBLY TOOL	1
623014	ASSEMBLY TOOL, PRESS. FOOT NUT	1
623015	ASSEMBLY TOOL, TRIGGER LOCK	1
623334	ASSEMBLY TOOL, PRESSURE HYDRAULIC & FRONT ENCLOSURE	1
623515	ASSEMBLY TOOL, PRESSURE FOOT NUT	1
623520	ASSEMBLY TOOL, BULKHEAD REMOVAL	1
623647	ASSEMBLY TOOL, DEPTH STOP	1
632424	REMOVAL TOOL, VALVE	1
624759	SLIDE HAMMER PULLER	1
624760	ASSEMBLY FIXTURE	1
624761	WRENCH, SPINDLE BEARING LOCKNUT	1
624762	BEARING INSTALLER	1
624763	REMOVAL TOOL, FEED CONTROL VALVE	1
624764	REMOVAL TOOL, PILOT VALVE	1
624765	ARBOR PRESS FIXTURE	1
624766	VALVE INSTALLATION TOOL	1
624767	WRENCH, FEED CONTROL VALVE	1
624768	TEE WRENCH, FOOT BODY	1
629251	TOOL, 136SC PULL ROD BUSHING	1
629252	TOOL, 15/120SC PULL ROD BUSHING	1
632424	RETRACT AND DWELL & UNCLAMP CHECK VALVE TOOL	1

GEAR SET ASSEMBLIES

621835 - 270RPM

Part No.	Name of Part	Qty.
623848		
REF.	Assembly, Backhead	1
621515	Assembly, Spacer	1
623772	Plate, Gear Set	2
623770	Gear, Spindle	1
623769	Pinion, Reduction	1
623771	Gear, Reduction	1
622129	Bearing, Ball, Flng	2
812231	Ring, Retaining	1
622134	Key, Woodruff	1
833689	Ring, Retainer	2
622787	Screw, Soc, Hd, Cap	4
629556	Gear Plate Spacer	1

Backhead Assembly is shown for reference only and is not part of the gear assembly. Spindle Gear is not shown, but is supplied loose with assembly. Retainer Ring is used on the 180 RPM only.

621503 - 470RPM

Part No.	Name of Part	Qty.
623848		
REF.	Assembly, Backhead	1
621515	Assembly, Spacer	1
622803	Plate, Gear Set	2
622800	Gear, Spindle	1
622801	Pinion, Reduction	1
622802	Gear, Reduction	1
622129	Bearing, Ball, Flng	2
812231	Ring, Retaining	3
622134	Key, Woodruff	1
622787	Screw, Soc, Hd, Cap	4
629556	Gear Plate Spacer	1

Backhead Assembly is shown for reference only and is not part of the gear assembly. Spindle Gear is not shown, but is supplied loose with assembly.

621837 - 700RPM

Part No.	Name of Part	Qty.
623848		
REF.	Assembly, Backhead	1
621515	Assembly, Spacer	1
623773	Plate, Gear Set	2
623779	Gear, Spindle	1
622801	Pinion, Reduction	1
623778	Gear, Reduction	1
622129	Bearing, Ball, Flng	2
812231	Ring, Retaining	3
622134	Key, Woodruff	1
622787	Screw, Soc, Hd, Cap	4
629556	Gear Plate Spacer	1

Backhead Assembly is shown for reference only and is not part of the gear assembly. Spindle Gear is not shown, but is supplied loose with assembly.

621836 - 900RPM

Part No.	Name of Part	Qty.
623848		
REF.	Assembly, Backhead	1
621515	Assembly, Spacer	1
623774	Plate, Gear Set	2
623776	Gear, Spindle	1
622801	Pinion, Reduction	1
623777	Gear, Reduction	1
622129	Bearing, Ball, Flng	2
812231	Ring, Retaining	3
622134	Key, Woodruff	1
622787	Screw, Soc, Hd, Cap	4
629556	Gear Plate Spacer	1

Backhead Assembly is shown for reference only and is not part of the gear assembly. Spindle Gear is not shown, but is supplied loose with assembly.

621504 - 1,150RPM

Part No.	Name of Part	Qty.
623848		
REF.	Assembly, Backhead	1
621515	Assembly, Spacer	1
622807	Plate, Gear Set	2
622806	Gear, Spindle	1
622801	Pinion, Reduction	1
622799	Gear, Reduction	1
622129	Bearing, Ball, Flng	2
812231	Ring, Retaining	3
622134	Key, Woodruff	1
622787	Screw, Soc, Hd, Cap	4
629556	Gear Plate Spacer	1

Backhead Assembly is shown for reference only and is not part of the gear assembly. Spindle Gear is not shown, but is supplied loose with assembly.

621606 - 2,200RPM

Part No.	Name of Part	Qty.
623848		
REF.	Assembly, Backhead	1
621515	Assembly, Spacer	1
623259	Plate, Gear Set	2
623258	Gear, Spindle	1
623257	Gear, Reduction	1
622129	Bearing, Ball, Flng	2
812231	Ring, Retaining	3
622787	Screw, Soc, Hd, Cap	4
629556	Gear Plate Spacer	1

Backhead Assembly is shown for reference only and is not part of the gear assembly. Spindle Gear is not shown, but is supplied loose with assembly.

GEAR SET ASSEMBLIES

621505 - 3,500RPM

Part No.	Name of Part	Qty.
623848		
REF.	Assembly, Backhead	1
621515	Assembly, Spacer	1
622786	Plate, Gear Set	2
622783	Gear, Spindle	1
622784	Pinion, Reduction	1
622785	Gear, Reduction	1
622129	Bearing, Ball, Flng	2
812231	Ring, Retaining	3
622134	Key, Woodruff	1
622787	Screw, Soc, Hd, Cap	4
629556	Gear Plate Spacer	1

Backhead Assembly is shown for reference only and is not part of the gear assembly. Spindle Gear is not shown, but is supplied loose with assembly.

621686 - 5,500RPM

Part No.	Name of Part	Qty.
623848		
REF.	Assembly, Backhead	1
621515	Assembly, Spacer	1
622796	Plate, Gear Set	2
622795	Gear, Spindle	1
622784	Pinion, Reduction	1
622785	Gear, Reduction	1
622129	Bearing, Ball, Flng	2
812231	Ring, Retaining	3
622134	Key, Woodruff	1
622787	Screw, Soc, Hd, Cap	4
629556	Gear Plate Spacer	1

Backhead Assembly is shown for reference only and is not part of the gear assembly. Spindle Gear is not shown, but is supplied loose with assembly.

621506 - 7,000RPM

Part No.	Name of Part	Qty.
623848		
REF.	Assembly, Backhead	1
621515	Assembly, Spacer	1
622805	Plate, Gear Set	2
622804	Gear, Spindle	1
622784	Pinion, Reduction	1
622785	Gear, Reduction	1
622129	Bearing, Ball, Flng	2
812231	Ring, Retaining	3
622134	Key, Woodruff	1
622787	Screw, Soc, Hd, Cap	4
629556	Gear Plate Spacer	1

Backhead Assembly is shown for reference only and is not part of the gear assembly. Spindle Gear is not shown, but is supplied loose with assembly.

621507 - 14,000RPM

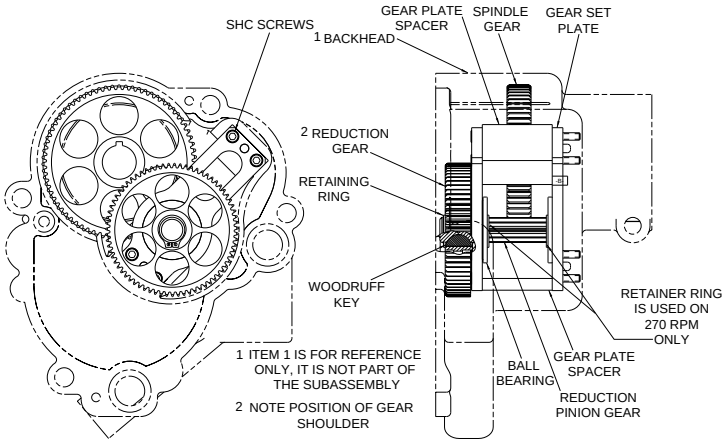
Part No.	Name of Part	Qty.
623848		
REF.	Assembly, Backhead	1
621515	Assembly, Spacer	1
622809	Plate, Gear Set	2
622804	Gear, Spindle	1
622784	Pinion, Reduction	1
622785	Gear, Reduction	1
622902	Gear, Pinion Overlay	1
622129	Bearing, Ball, Flng	2
812231	Ring, Retaining	3
622134	Key, Woodruff	1
622787	Screw, Soc, Hd, Cap	4
629556	Gear Plate Spacer	1

Backhead Assembly is shown for reference only and is not part of the gear assembly. Spindle Gear and Pinion Overlay Gear are not shown, but is supplied loose with assembly.

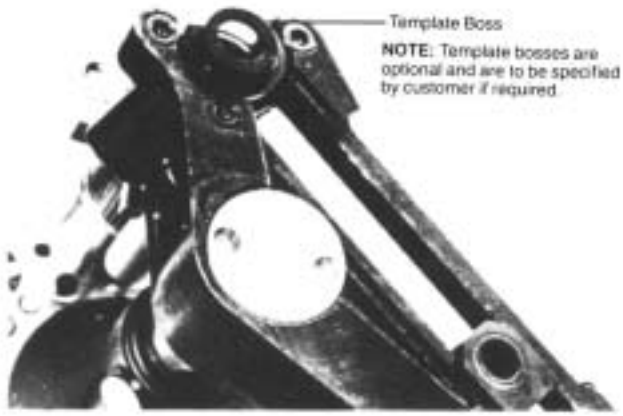
621537 - 23,500RPM

Part No.	Name of Part	Qty.
623848		
REF.	Assembly, Backhead	1
621515	Assembly, Spacer	1
622903	Plate, Gear Set	2
622904	Gear, Spindle	1
622784	Pinion, Reduction	1
622785	Gear, Reduction	1
622902	Gear, Pinion Overlay	1
622129	Bearing, Ball, Flng	2
812231	Ring, Retaining	3
622134	Key, Woodruff	1
622787	Screw, Soc, Hd, Cap	4
629556	Gear Plate Spacer	1

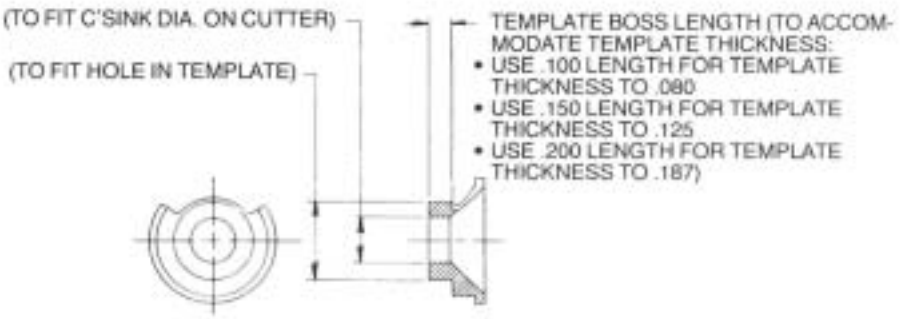
Backhead Assembly is shown for reference only and is not part of the gear assembly. Spindle Gear and Pinion Overlay Gear are not shown, but is supplied loose with assembly.



Template Boss



APPLICATION		TEMPLATE BOSS PART NO.		
TEMPLATE HOLE DIA.	CUTTER DIA.	WITH .100 BOSS LENGTH	WITH .150 BOSS LENGTH	WITH .200 BOSS LENGTH
.437	.271	622708	622723	622740
.437	.286	622707	622724	622741
.437	.317	622708	622725	622742
.500	.271	622709	622726	622743
.500	.286	622710	622727	622744
.500	.317	622711	622728	622745
.500	.349	622712	622729	622746
.500	.380	622713	622730	622747
.625	.317	622714	622731	622748
.625	.349	622715	622732	622749
.625	.380	622716	622733	622750
.625	.411	622717	622734	622751
.625	.489	622718	622735	622752
.625	.505	622719	622736	622753
.750	.505	622720	622737	622754
.750	.625	622721	622738	622755
.875	.625	622722	622739	622756


(TO FIT C'SINK DIA. ON CUTTER)
(TO FIT HOLE IN TEMPLATE)
TEMPLATE BOSS LENGTH (TO ACCOMMODATE TEMPLATE THICKNESS:
• USE .100 LENGTH FOR TEMPLATE THICKNESS TO .080
• USE .150 LENGTH FOR TEMPLATE THICKNESS TO .125
• USE .200 LENGTH FOR TEMPLATE THICKNESS TO .187)

Jig Collet Foot Attachments

Depth Sensing Jig Collet Foot (Pictured)
Depth sensing jig collet foot is used for accurately drilling and countersinking hole layouts utilizing a simple fixture plate. The cutter passes centrally through the drill motor collet to produce holes concentric with the fixture plate holes. The depth sensing sleeve will drill and accurately countersink with fixture-to workpiece variations of up to .125". Coolant and air blast port is fitted to the foot.

User must specify template hole and drill-countersink size as well as drill-countersink configuration.

Non Depth Sensing Jig Collet Foot
Non-depth sensing jig collet foot is similar to the above foot without depth sensing capability. This foot is used for straight drilling applications where "rough" depth sensing only is required. This foot grips straight shank drills utilizing an "O-W" type collet (not supplied).

User must specify template hole and drill size.

High Curvature Pad Assembly

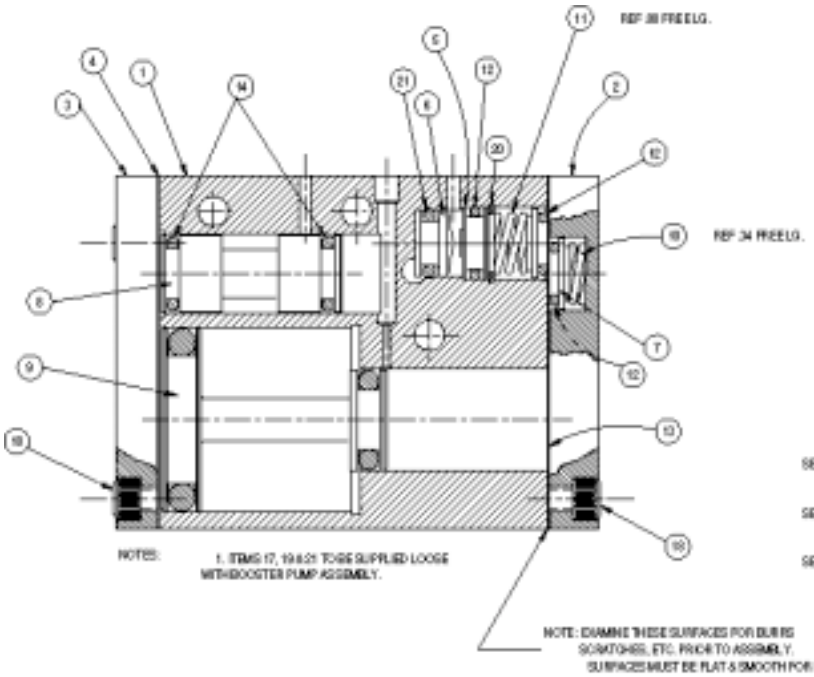
A high curvature pad (Part No. 621522) is available for use in place of the standard pressure foot pad. The high curvature pad enables the drill to be used on surfaces with a greater curvature than the standard pad is capable of handling.

Regulator Assembly

The Regulator Assembly (Part No. 621521) replaces the plug and adds the capability of regulating clamp pressure and drill thrust. This accessory is particularly useful when drilling composite material. A pressure gage (not supplied) may be installed on side cover to set and monitor clamp air pressure. For even greater control over clamp pressure, the internal clamp spring may be removed. This will limit the clamp force to that generated by the regulated air working against the clamp piston.

Booster Pump Assembly

For increased clamping force or feed pressure, an optional Booster Pump Kit (Part No. 621482) is available. The pump provides extra clamp and feed pressures when drilling Titanium or taper drilling applications. The Booster Pump assembly will increase both clamp and feed forces by a factor of 2.5. The pump is easily installed on the Q-Matic Drill by replacing the cover supplied with the tool with the Booster Pump Kit using the three screws supplied with the pump.

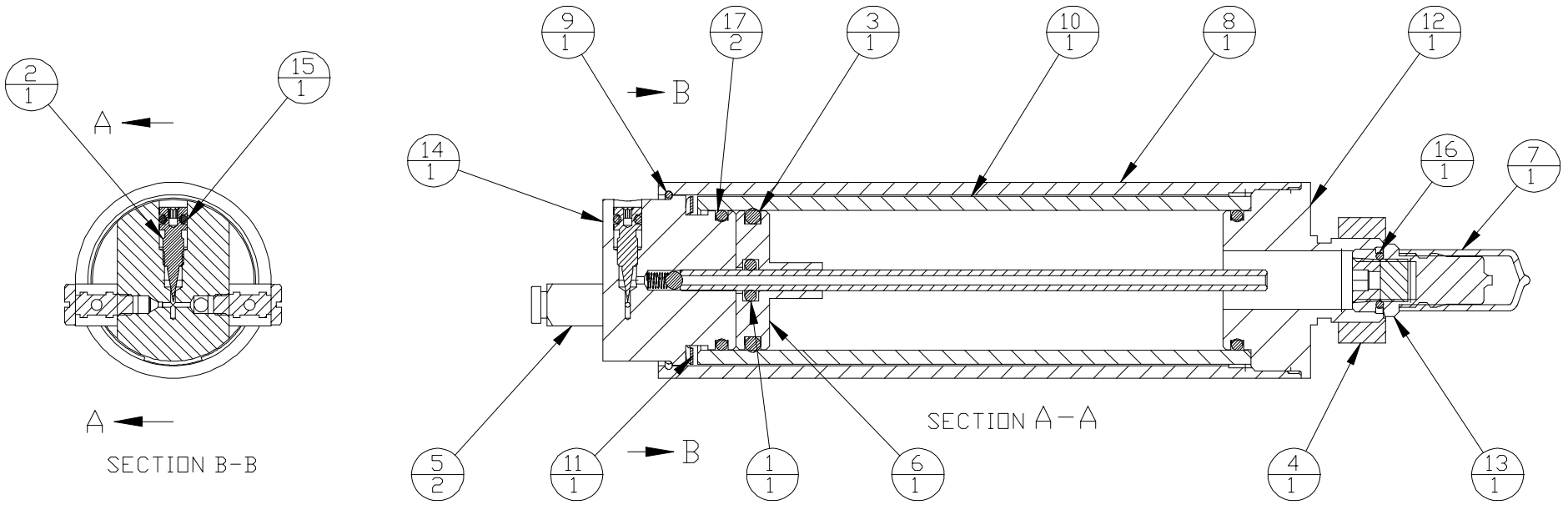

REF .38 FREE LG.
REF .34 FREE LG.
NOTES:
1. ITEMS 17, 19 & 21 TO BE SUPPLIED LOOSE WITH BOOSTER PUMP ASSEMBLY.
NOTE: EXAMINE THESE SURFACES FOR BURRS SCRATCHES, ETC. PRIOR TO ASSEMBLY. SURFACES MUST BE FLAT & SMOOTH FOR PROPER SEALING

ITEM NO.	NO. REQD.	CODE NUMBER	DESCRIPTION
1	1	621508	ASSY, BODY
2	1	621531	ASSY, END PLATE (HIGH PRESS)
3	1	622868	END PLATE (LOW PRESS)
4	1	622792	GASKET, END PLATE
5	1	622862	VALVE, PRESS. RELIEF
6	1	622863	PISTON, PRESS. RELIEF
7	2	622864	VALVE, CHECK
8	1	622865	VALVE, SHUTTLE
9	1	622866	PISTON
10	1	622862	SPRING, COMPRESSION
11	1	622863	SPRING, COMPRESSION
12	3	844004	O-RING
13	1	625112	GASKET
14	2	622864	O-RING
15	1	844008	O-RING
16	1	844016	O-RING
SEE NOTE 1	17	2	847718	O-RING
18	10	863337	SCREW
SEE NOTE 1	19	2	617265	SCREW
20	1	622865	RETAINER RING
SEE NOTE 1	21	2	844303	O-RING

Mist Lubricator Assembly

Mist lubricator assemblies are available to introduce coolant and an air blast to the cutter. The lubricator is actuated by air from the accessory air tap on the motor side and only functions when the motor is running. On the following pages are the different models and mounts.

PRESSURE FILL MIST LUBRICATOR



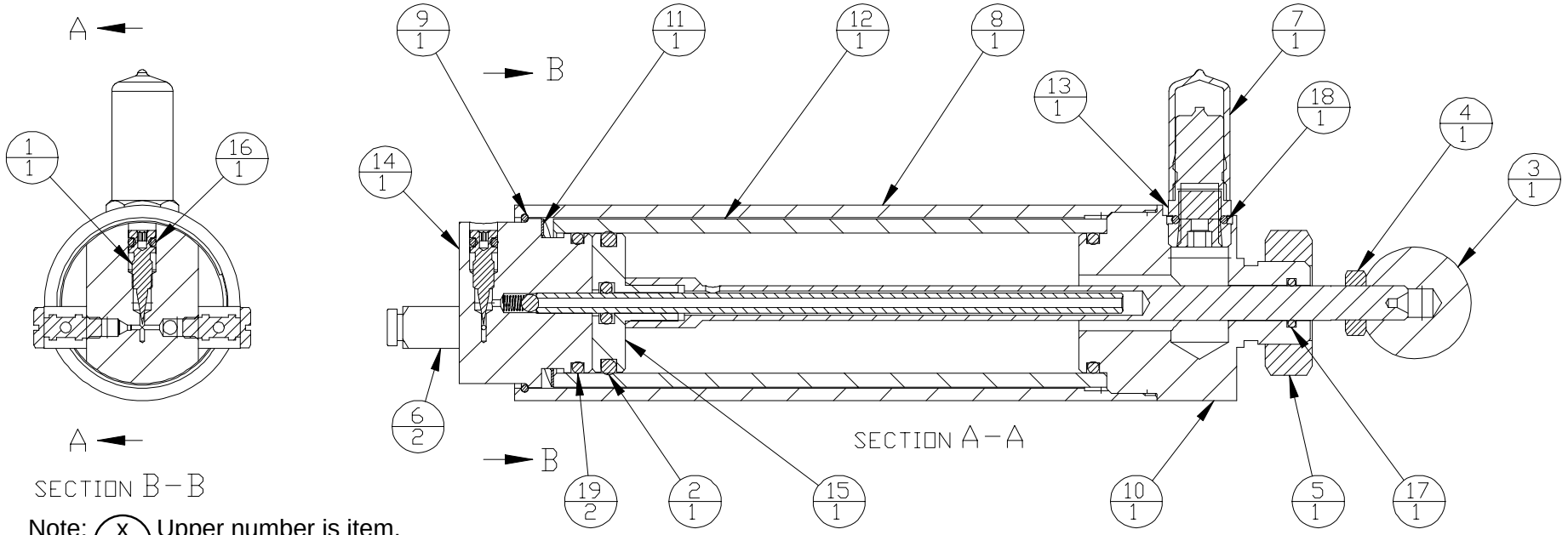
Note: (x/x) Upper number is item.
Lower number is quantity required.

631802 PRESSURE FILL LARGE CAPACITY

ITEM	PART NO.	PART NAME	QTY.
1	203568	RING, O	1
2	622026	VALVE, NEEDLE	1
3	622881	RING, O	1
4	624903	NUT, JAM HEX	1
5	624905	FITTING	2
6	624914	PISTON	1
7	625015	S-CAP	1
8	629086	COVER, LARGE CAPACITY	1
9	629093	WIRE, RETAINING	1
10	629090	CYLINDER, LARGE CAPACITY	1
11	629148	SPRING, WAVE	1
12	629095	CAP, MOUNT (PRESSURE FILL)	1
13	631586	FILTER ASSEMBLY	1
14	631756	END CAP ASSEMBLY (LARGE)	1
15	844301	RING, O	1
16	844307	RING, O	1
17	869025	RING, O	2

631801 PRESSURE FILL SMALL CAPACITY

ITEM	PART NO.	PART NAME	QTY.
1	203568	RING, O	1
2	622026	VALVE, NEEDLE	1
3	622881	RING, O	1
4	624903	NUT, JAM HEX	1
5	624905	FITTING	2
6	624914	PISTON	1
7	625015	S-CAP	1
8	629097	COVER, SMALL CAPACITY	1
9	629093	WIRE, RETAINING	1
10	629094	CYLINDER, SMALL CAPACITY	1
11	629148	SPRING, WAVE	1
12	629095	CAP, MOUNT (PRESSURE FILL)	1
13	631586	FILTER ASSEMBLY	1
14	631757	END CAP ASSEMBLY (SMALL)	1
15	844301	RING, O	1
16	844307	RING, O	1
17	869025	RING, O	2



Note: (X/X) Upper number is item.
Lower number is quantity required.

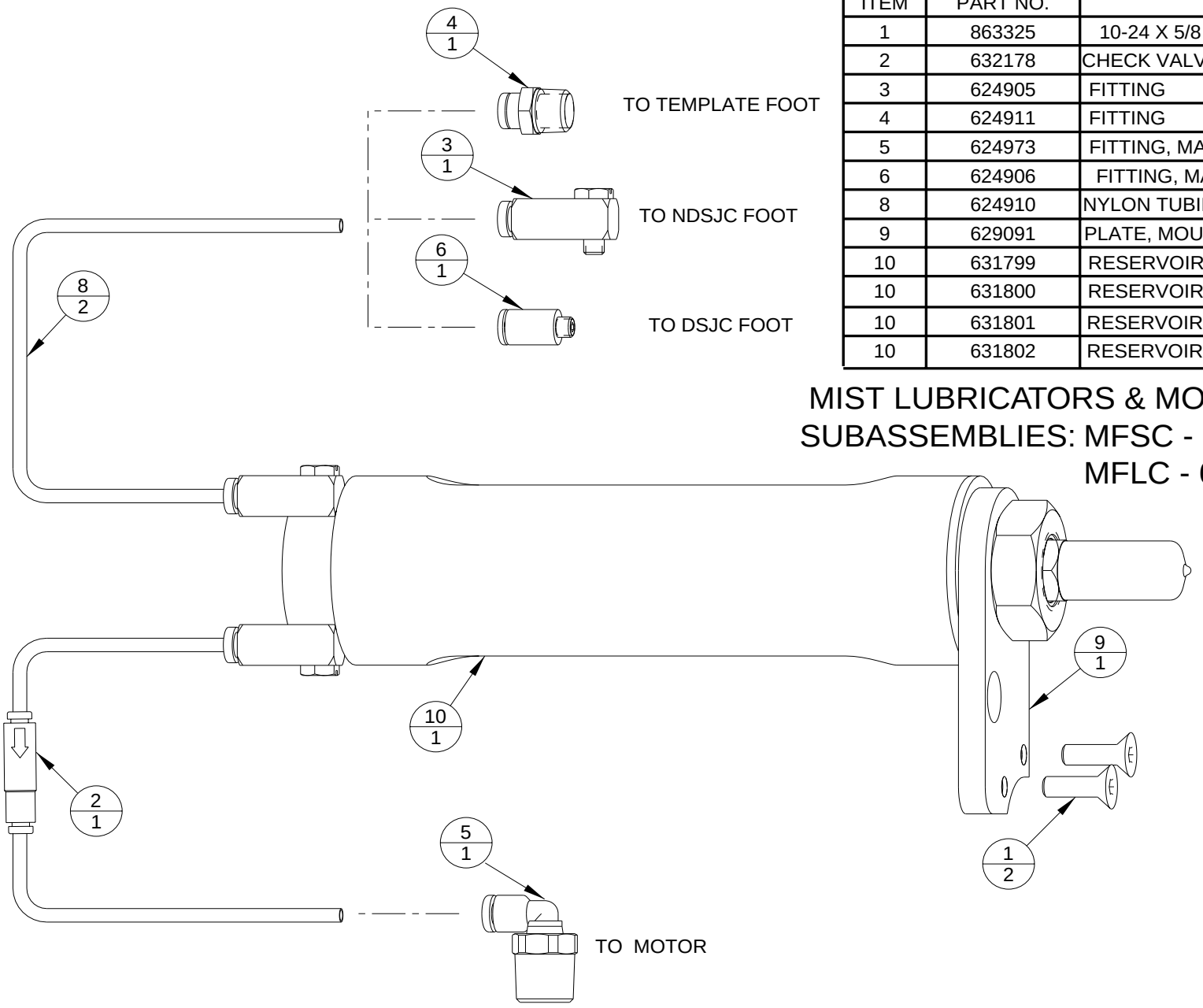
631799 MANUAL FILL LARGE CAPACITY

ITEM	PART NO.	PART NAME	QTY.
1	622026	VALVE, NEEDLE	1
2	622881	RING, O	1
3	623422	KNOB	1
4	624902	NUT, JAM HEX	1
5	624903	NUT, JAM HEX	1
6	624905	FITTING	2
7	625015	S-CAP	1
8	629086	COVER, LARGE CAPACITY	1
9	629093	WIRE, RETAINING	1
10	629088	CAP, MOUNT (PUMP FILL)	1
11	629148	SPRING, WAVE	1
12	629090	CYLINDER, LARGE CAPACITY	1
13	631586	FILTER ASSEMBLY	1
14	631756	END CAP ASSEMBLY (LARGE)	1
15	631759	PISTON ROD ASSY (LARGE)	1
16	844301	RING, O	1
17	844306	RING, O	1
18	844307	RING, O	1
19	869025	RING, O	2

631800 MANUAL FILL SMALL CAPACITY

ITEM	PART NO.	PART NAME	QTY.
1	622026	VALVE, NEEDLE	1
2	622881	RING, O	1
3	623422	KNOB	1
4	624902	NUT, JAM HEX	1
5	624903	NUT, JAM HEX	1
6	624905	FITTING	2
7	625015	S-CAP	1
8	629097	COVER, SMALL CAPACITY	1
9	629093	WIRE, RETAINING	1
10	629088	CAP, MOUNT (PUMP FILL)	1
11	629148	SPRING, WAVE	1
12	629094	CYLINDER, SMALL CAPACITY	1
13	631586	FILTER ASSEMBLY	1
14	631757	END CAP ASSEMBLY (SMALL)	1
15	631758	PISTON ROD ASSY (SMALL)	1
16	844301	RING, O	1
17	844306	RING, O	1
18	844307	RING, O	1
19	869025	RING, O	2

MOUNTING FOR MIST LUBRICATOR



ITEM	PART NO.	PART NAME	QTY.
1	863325	10-24 X 5/8 SFHCS	2
2	632178	CHECK VALVE	1
3	624905	FITTING	1
4	624911	FITTING	1
5	624973	FITTING, MALE ELBOW	1
6	624906	FITTING, MALE PUSH-IN	1
8	624910	NYLON TUBING	1
9	629091	PLATE, MOUNTING	1
10	631799	RESERVOIR, LARGE MANUAL FILL	1
10	631800	RESERVOIR, SMALL MANUAL FILL	1
10	631801	RESERVOIR, SMALL PRESSURE FILL	1
10	631802	RESERVOIR, LARGE PRESSURE FILL	1

MIST LUBRICATORS & MOUNTS COMPLETE
SUBASSEMBLIES: MFSC - 641109, PFSC - 641110
MFLC - 641081, PFLC - 641082.

COOPER Tools

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